CATALOGUE F

SHEET METAL & SUPPLY CO LANGASTER PA.



MILL SUPPLIES

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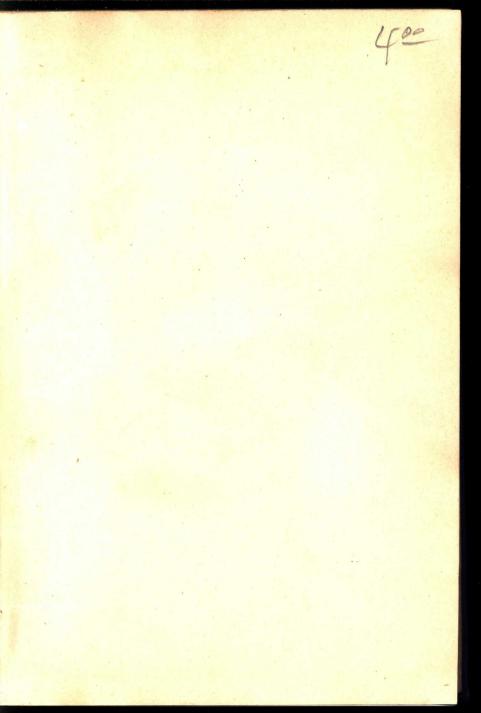
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Sheet Metal and Supply Co.

CATALOGUE F



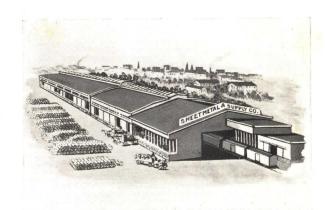
MANUFACTURERS — DISTRIBUTORS JOBBERS

MILL AND MACHINERY SUPPLIES STEAM AND ENGINEERS SUPPLIES BLACK AND GALVANIZED SHEETS, SOLDER, METALS, Etc.

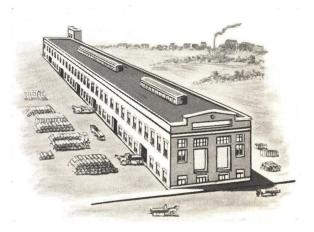
Offices and Show Rooms; Christian and Marion Streets

Warehouses and Railroad Sidings: Concord and Mulberry Streets

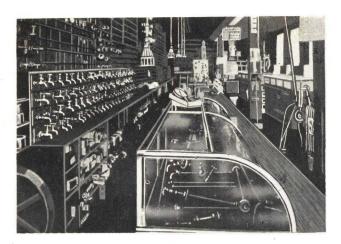
LANCASTER, PA.



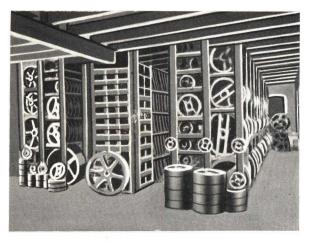
WAREHOUSES AND RAILROAD SIDINGS:
CONCORD STREET



WAREHOUSE AND YARDS: MULBERRY STREET



SECTION OF STORE ROOM



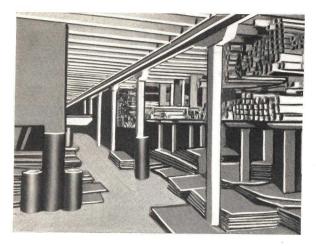
SECTION OF PULLEY DEPARTMENT



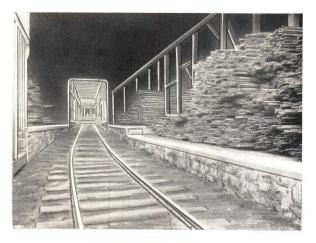
INTERIOR VIEW OF WAREHOUSE



INTERIOR VIEW OF WAREHOUSE



SECTION OF SHEET DEPARTMENT



VIEW OF PIPE WAREHOUSES



STRICTLY WROUGHT PIPE RELIANCE BLACK AND GALVANIZED

ALL WEIGHTS AND DIMENSIONS ARE NOMINAL



PLATE 7800

	List	DIAME	rers		Weigh Fo		Threads
Size	Price per Foot	External	Internal	Thickness	Plain Ends	Threads and Couplings	per Inch
1/8 1/4 3/8 1/2	.05 ½ .06 .06 .08 ½	.405 .540 .675 .840	.269 .364 .493 .622	.068 .088 .091 .109	.244 .424 .567 .850	.245 .425 .568 .852	27 18 18 14
$^{3/4}_{1}_{1 \frac{1}{4}}_{1 \frac{1}{2}}$	$.11\frac{1}{2}$ $.17$ $.23$ $.27\frac{1}{2}$	1.050 1.315 1.660 1.900	.824 1.049 1.380 1.610	.113 .133 .140 .145	$\begin{array}{c} 1.130 \\ 1.678 \\ 2.272 \\ 2.717 \end{array}$	1.134 1.684 2.281 2.731	$ \begin{array}{c} 14 \\ 11 \frac{1}{2} \\ 11 \frac{1}{2} \\ 11 \frac{1}{2} \end{array} $
$\begin{array}{c} 2 \\ 2 \frac{1}{2} \\ 3 \\ 3 \frac{1}{2} \end{array}$	$.37$ $.58\frac{1}{2}$ $.76\frac{1}{2}$ $.92$	2.375 2.875 3.500 4.000	2.067 2.469 3.068 3.548	.154 .203 .216 .226	3.652 5.793 7.575 9.109	3.678 5.819 7.616 9.202	11½ 8 8 8
$\begin{array}{c} 4 \\ 4 \frac{1}{2} \\ 5 \\ 6 \end{array}$	1.09 1.27 1.48 1.92	4.500 5.000 5.563 6.625	$\begin{array}{c} 4.026 \\ 4.506 \\ 5.047 \\ 6.065 \end{array}$.237 .247 .258 .280	$10.790 \\ 12.538 \\ 14.617 \\ 18.974$	10.889 12.642 14.810 19.185	8 8 8 8
7 8 9	2.38 2.50 3.45	$\begin{array}{c} 7.625 \\ 8.625 \\ 9.625 \end{array}$	7.023 8.071 8.941	.301 .277 .342	23.544 24.696 33.907	$\begin{array}{c} 23.769 \\ 25.000 \\ 34.188 \end{array}$	8 8 8
10 11	3.50 4.63	$10.750 \\ 11.750$	10.136 11.000	.307 .375	$34.240 \\ 45.557$	35.000 46.247	8
12 13 14	4.50 5.60 6.10	12.750 14.000 15.000	12.090 13.250 14.250	.330 .375 .375	43.773 54.568 58.573	45.000 55.824 60.375	8 8 8
15	6.50	16.000	15.250	.375	62.579	64,500	8

The permissible variation in weight is 5 per cent, above and 5 per cent, below. Furnished with threads and couplings and in random lengths unless otherwise ordered. All weights given in pounds. All dimensions given in inches. For cut lengths, an extra charge will be made above random lengths. For pipe smoothed on the inside, known as reamed and drifted, an extra charge will be made above standard pipe. For Galvanized, or Coated pipe, an extra charge will be made above Black.



READING OR BYERS GENUINE WROUGHT PIPE

BLACK AND GALVANIZED

ALL WEIGHTS AND DIMENSIONS ARE NOMINAL



PLATE 7801

	List Price	DIAME	TERS			T PER	Threads
Size			Internal	Thickness	Plain Ends	Threads and Couplings	per Inch
1/8 1/4 3/8 1/2	$05\frac{1}{2}$ 06 06 $08\frac{1}{2}$.405 .540 .675 .840	.269 .364 .493 .622	.068 .088 .091 .109	.244 .424 .567 .850	.245 .425 .568 .852	27 18 18 14
$1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 2$	$.11\frac{1}{2}$ $.17$ $.23$ $.27\frac{1}{2}$	1.050 1.315 1.660 1.900	.824 1.049 1.380 1.610	.113 .133 .140 .145	$\begin{array}{c} 1.130 \\ 1.678 \\ 2.272 \\ 2.717 \end{array}$	1.134 1.684 2.281 2.731	$\begin{array}{c} 14 \\ 11\frac{1}{2} \\ 11\frac{1}{2} \\ 11\frac{1}{2} \end{array}$
$\frac{2}{2}\frac{1}{2}$ $\frac{3}{3}\frac{1}{2}$	$\begin{array}{c} .37 \\ .58\frac{1}{2} \\ .76\frac{1}{2} \\ .92 \end{array}$	2.375 2.875 3.500 4.000	2.067 2.469 3.068 3.548	.154 .203 .216 .226	3.652 5.793 7.575 9.109	3.678 5.819 7.616 9.202	11½ 8 8 8
$\frac{4}{4}\frac{1}{2}$ $\frac{5}{6}$	1.09 1.27 1.48 1.92	4.500 5.000 5.563 6.625	4.026 4.506 5.047 6.065	.237 .247 .258 .280	$\begin{array}{c} 10.790 \\ 12.538 \\ 14.617 \\ 18.974 \end{array}$	10.889 12.642 14.810 19.185	8 8 8
7 8 9	2.38 2.50 3.45	$\begin{array}{c} 7.625 \\ 8.625 \\ 9.625 \end{array}$	7.023 8.071 8.941	.301 .277 .342	23.544 24.696 33.907	23.769 25.000 34.188	8 8 8
10 11	3.50 4.63	10.750 11.750	10.136 11.000	.307 .375	$34.240 \\ 45.557$	35.000 46.247	8
12 13 14	4.50 5.60 6.10	12.750 14.000 15.000	12,090 13,250 14,250	.330 .375 .375	43.773 54.568 58.573	45.000 55.824 60.375	8 8 8
15	6.50	16.000	15,250	.375	62.579	64.500	8

The permissible variation in weight is 5 per cent, above and 5 per cent, below. Furnished with threads and couplings and in random lengths unless otherwise ordered, All weights given in pounds. All dimensions given in inches.

All weights given in pounds. All dimensions given in inches.
For cut lengths, an extra charge will be made above random lengths.
For pipe smoothed on the inside, known as reamed and drifted, an extra charge will be made above standard pipe.

For Galvanized, or Coated pipe, an extra charge will be made above Black.



EXTRA STRONG PIPE

BLACK AND GALVANIZED

ALL WEIGHTS AND DIMENSIONS ARE NOMINAL

	T1 . D .	DIAM	ETERS		Weight per
Size	List Price per Foot	External	Internal	Thickness	Foot Plain Ends
1/0	.12	.405	.215	.095	.314
1/8 1/4 3/8 1/2 3/4	.07 1/2	.540	.302	.119	.535
3/6	.07 1/2	.675	.423	.126	.738
1%	.11	.840	.546	.147	1.087
3/	15	1.050	.742	.154	1.473
1	.15 .22	1.315	.957	.179	2.171
11/4	.30	1.660	1.278	.191	2.996
11%	.36 1/2	1.900	1.500	.200	3.631
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$.50 1/2	2.375	1.939	.218	5.022
21/6	.77	2.875	2.323	.276	7.661
3	1.03	3.500	2.900	.300	10.252
3 1/6	1.25	4.000	3.364	.318	12.505
4	1.50	4.500	3.826	.337	14.983
41/6	1.80	5.000	4.290	.355	17.611
5	2.08	5.563	4.813	.375	20.778
6	2.86	6.625	5.761	.432	28.573
7	3.81	7.625	6.625	.500	38.048
8	4.34	8.625	7.625	.500	43.388
4 ½ 5 6 7 8 9	4.90	9.625	8.625	.500	48.728
10	5.48	10.750	9.750	500	54.735
11	6.10	11.750	10.750	500	60.075
12	6.55	12.750	11.750	.500	65.415

The permissible variation in weight is 5 per cent. above and 5 per cent. below.

DOUBLE EXTRA STRONG PIPE

BLACK AND GALVANIZED

	T D.	DIAME	TERS		Weight pe	
Size	List Price per Foot	External	Internal	Thickness	Foot Plain Ends	
$\frac{\frac{1}{2}}{\frac{3}{4}}$ $\frac{1}{1}\frac{1}{4}$ $\frac{1}{1}\frac{1}{2}$.32 .35 .37 .52½ .65	.840 1.050 1.315 1.660 1.900 2.375	.252 .434 .599 .896 1.100 1.503	.294 .308 .358 .382 .400 .436	1.714 2.440 3.659 5.214 6.408 9.029	
2 1/2 2 1/2 3 3 1/2 4 4 1/4	1.37 1.86 2.30 2.76 3.26	2.875 3.500 4.000 4.500 5.000	1,771 2,300 2,728 3,152 3,580	.552 .600 .636 .674 .710	13.695 18.583 22.850 27.541 32.530	
4 ½ 5 6 7 8	3.86 5.32 6.35 7.25	5.563 6.625 7.625 8.625	4.063 4 897 5.875 6.875	.750 .864 .875 .875	38.552 53.160 63.079 72.424	

The permissible variation in weight is 10 per cent. above and 10 per cent. below. Furnished with plain ends and in random lengths, unless otherwise ordered. For pipe fitted with threads and couplings, an extra charge will be made above plain ends.

For cut lengths, an extra charge will be made above random. For Galvanized, or Coated pipe, an extra charge will be made above Black.



LAP WELDED CASING SCREW AND SOCKET

ALL WEIGHTS AND DIMENSIONS ARE NOMINAL

	List	DIAME	TERS		WEIG Fe	HT FOR	Threads
Size	Price per Foot	External	Internal	Thickness	Plain Ends	Threads and Couplings	per Inch
$\begin{array}{c} 2 \\ 2 \frac{1}{4} \\ 2 \frac{1}{2} \\ 2 \frac{3}{4} \end{array}$.33 .33 .33 .40	"2.250 2.500 2.750 3.000	2.050 2.284 2.524 2.768	.100 .108 .113 .116	2.296 2.759 3.182 3.572	2.340 2.820 3.250 3.650	14 14 14 14
$ \begin{array}{c} 3 \\ 3 \\ 4 \\ 3 \\ 4 \\ 3 \\ 4 \\ 3 \\ 4 \end{array} $	$\begin{array}{c} .41 \\ .46 \\ .51 \\ .56 \frac{1}{2} \end{array}$	3.250 3.500 3.750 4.000	3.010 3.250 3.492 3.732	.120 .125 .129 .134	4.011 4.505 4.988 5.532	4.100 4.600 5.100 5.650	14 14 14 14
$\begin{array}{c} 4 \\ 4 \frac{1}{4} \\ 4 \frac{1}{2} \\ 4 \frac{3}{4} \end{array}$	$.62$ $.68\frac{1}{2}$ $.74$ $.81$	4.250 4.500 4.750 5.000	3.974 4.216 4.460 4.696	.138 .142 .145 .152	6.060 6.609 7.131 7.870	6.200 6,750 7.250 8.000	14 14 14 14
$ 5 $ $ 5\frac{3}{16} $ $ 5\frac{5}{8} $ $ 6\frac{1}{4} $.85 .90 1.05 1.20	5,250 5,500 6,000 6,625	4.944 5.192 5.672 6.287	.153 .154 .164 .169	8.328 8.792 10.222 11.652	8.500 9.000 10.500 12.000	14 14 14 14
$6\frac{5}{8}$ $7\frac{1}{4}$ $7\frac{5}{8}$ $8\frac{1}{4}$	1.35 1.48 1.60 1.75	7.000 7.625 8.000 8.625	6.652 7.263 7.628 8,249	.174 .181 .186 .188	12.685 14.390 15.522 16.940	13.000 14.750 16.000 17.500	14 14 $11\frac{1}{2}$ $11\frac{1}{2}$
$ \begin{array}{r} 858 \\ 958 \\ 1058 \\ 1158 \end{array} $	1.90 2.28 2.68 3.15	9.000 10,000 11,000 12.000	8.608 9.582 10.552 11.514	.196 .209 .224 .243	18.429 21.855 25.780 30.512	$\begin{array}{c} 19.000 \\ 22.750 \\ 26.750 \\ 31.500 \end{array}$	$\begin{array}{c} 11\frac{1}{2} \\ 11\frac{1}{2} \\ 11\frac{1}{2} \\ 11\frac{1}{2} \\ 11\frac{1}{2} \end{array}$
$12\frac{1}{2}$ $13\frac{1}{2}$ $14\frac{1}{2}$ $15\frac{1}{2}$	3.65 4.20 4.75 5.25	$\begin{array}{c} 13.000 \\ 14.000 \\ 15.000 \\ 16.000 \end{array}$	12.482 13.448 14.418 15.396	.259 .276 .291 .302	35.243 40.454 45.714 50.632	36,500 42,000 47,500 52,500	$\begin{array}{c} 11\frac{1}{2} \\ 11\frac{1}{2} \\ 11\frac{1}{2} \\ 11\frac{1}{2} \\ 11\frac{1}{2} \end{array}$

The permissible variation in weight is 5% above and 5% below.

Furnished with threads and couplings and in random lengths, unless otherwise ordered.

Thickness of walls make it impracticable to cut threads of coarser pitch than shown on table.

For cut lengths, an extra charge will be made above random.

For Galvanized, or Coated casing, an extra charge will be made above Black.

LARGE O. D. PIPE-PLAIN ENDS

LIST PRICE PER FOOT

O. D.		THICKNESS											
Size Inches	14"	5//	3/8"	7 16	1/2"	3 //	5/8"	11/1	34"	7 8''	1''	11/8"	
	3.68	4.57	5.46	6.34	7.21	8.08	8.93		10.62				
14		4.91	5.86	6.81	7.75	8.68	9.60	10.51	11.42	13.20	14.96	16.6	
15	3.94	5.24	6.26	7.28	8.28	9.28	10.27	11.25	12.22	14.14	16.03	17.8	
16	4.21	5.57	6.66	7.74	8.82	9.88	10.94	11.98	13.02	15.07	17.09	19.0	
17	4.48		7.06	8.21	333		11.60				18.16		
18	4.74	5.91 6.58	7.86	9.15			12.94				20.30	22.6	
20		6.91	8.27				13.61						
21		= 04	8.67				14.27						
22			9.47				15.61						
24			10.27				16.94						
26			10.21	10.00			18.28						
28 30							19.61						

This pipe will be shipped in random lengths plain ends unless otherwise ordered For cut lengths, an extra charge above random will be made.

For threaded pipe, an extra charge above plain end will be made.

We can thread and couple up to 20 inches.

BOILER TUBES



PLATE 2

LIST PRICE PER FOOT

	STANDAR THICKNES		PRICE PER FOOT								
External Diameter, Inches	Birmingham Wire Gauge	Inches	Standard Thickness	One Extra Wire Gauge	Two Extra Wire Gauges	Three Extra Wire Gauges	Four Extra Wire Gauges				
$\begin{array}{c} 1\frac{3}{4} \\ 2 \\ 2\frac{1}{4} \\ 2\frac{1}{2} \end{array}$	13 13 13 12	.095 .095 .095 .109	.22 .21 .24 .30	.26 .24 .27 .33	.28 .26 .29 .36	.31 .28 .32 .39	.34 .31 .35 .43				
$ \begin{array}{c} 2 \frac{3}{4} \\ 3 \\ 3 \frac{1}{4} \\ 3 \frac{1}{2} \end{array} $	12 12 11 11	.109 .109 .120 .120	.34 .38 .45 .48	.37 .41 .49 .53	.40 .45 .53 .58	.44 .49 .59 .64	.48 .54 .63 .69				
$\frac{3}{4}$ $\frac{3}{4}$ $\frac{4}{4}$ $\frac{1}{2}$ $\frac{5}{4}$	11 10 10 9	.120 .134 .134 .148	.52 .61 .69 .81	.57 .66 .75	.62 .73 .83 .97	.68 .79 .89 1.08	.74 .88 .99 1.17				
6 7 8 9	8 8 8 7	.165 .165 .165 .180	1.08 1.27 1.45 1.78	1.17 1.38 1.58 1.99	1.31 1.54 1.76 2.15	1.41 1.66 1.90 2.31	1.52 1.78 2.05 2.50				
10 11 12 13	6 5 -4	.203 .220 .229 .238	2.22 2.63 2.99 3.36	2.39 2.84 3.23 3.64	2.57 3.07 3.51 3.98	2.79 3.35 3.76 4.19	3.04 3.53 4.10 4.72				

Boiler Tubes to special specifications, special prices on application.

Tubes more than four gauges heavier than Standard will be charged per pound.

PIPE COTTA SEWER TERRA

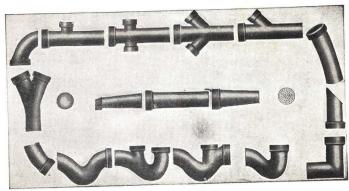


PLATE 2170

3 AND 4 INCH, per foot. 30 Elbows. 1.20 Curves. 90 Branches 1.20 Traps. 2.50 5 AND 6 INCH, per foot. 50 Elbows. 2.00 Curves. 1.50 Branches. 2.00 Traps. 4.00 8 INCH, per foot75 Elbows. 2.25 Branches. 3.00 Curves. 3.00 Traps. 6.50 9 AND 10 INCH, per foot. 1.00 Elbows. 4.00 Curves. 3.00 Curves. 3.00 Traps. 6.50 9 AND 10 INCH, per foot. 1.00 Curves. 3.00 Elbows. 4.00 Curves. 3.00 Branches. 4.00 Curves. 4.00 Branches. 9.00	12 INCH, per foot Elbows Curves Branches Traps. 15 INCH, per foot Elbows Curves Branches 18 INCH, per foot Elbows Curves Branches 20 INCH, per foot Elbows Curves Branches 21 INCH, per foot Elbows Curves Branches 22 INCH, per foot Elbows Curves Branches Branches	1.25 5.00 3.75 5.00 18.00 1.75 10.50 5.25 7.00 2.25 13.50 6.75 9.00 2.75 16.50 8.25 11.00 3.25 11.00 3.25 13.50 9.75 13.50 13.50 14.75 15.50 16.	24 INCH, per foot Elbows. Curves. Branches. 27 INCH, per foot Elbows. Curves. Branches. 30 INCH, per foot Elbows. Curves. Branches. 33 INCH, per foot Elbows. Curves. Branches. 33 INCH, per foot Elbows. Curves. Branches. Branches. Branches.	$\begin{array}{c} 3.75 \\ 22.50 \\ 11.25 \\ 15.00 \\ 7.75 \\ 46.50 \\ 23.25 \\ 38.75 \\ 9.25 \\ 55.50 \\ 27.75 \\ 46.25 \\ 11.00 \\ 66.00 \\ 33.00 \\ 55.00 \\ 13.00 \\ 65.00 \\ 65.00 \\ \end{array}$
---	---	--	---	--

Channel pipe price of 3 of one foot of pipe. Slants one foot or less price of three feet of pipe.

Increasers or reducers price of four feet size of large end

All branches from 3 to 12 inches inclusive containing branch of same dimension as pipe are listed at the price of 6 feet of pipe of corresponding size.

Branches 2 1/2 and 3 feet long with inlets 12 inches and smaller price of 6 feet of pipe.

Branches 2 1/2 and 3 feet long with inlet 15 inches and larger price of 8 feet of pipe.

Branches 2 1/2 and 3 feet long with inlet 15 inches and larger price of 8 feet of pipe.

Double branches 2 feet long with inlet 12 inches and larger price of 6 feet of pipe. Dranches 2½ and 3 leet long with inlet 15 inches and larger price of 8 leet of pipe. Double branches 2 feet long with inlet 12 inches and smaller price of 6 feet of pipe. Double branches 2½ or 3 feet long with inlet 15 inches or larger price of 8 feet of pipe. Stoppers 3 to 15 inch price of ½ foot of pipe. Strainers 3 to 15 inch price of 1 foot of pipe. Well traps price of 6 feet of pipe same size.

Add price of 1 foot of pipe for each additional opening to hand hold traps.

Pipe 1 foot long same price as 2 foot lengths.

CAST IRON PIPE



PLATE 37 CAST IRON PIPE

SPECIALS FOR CAST IRON PIPE



PLATE 38



PLATE 89 QUARTER BEND EIGHTH BEND



PLATE 40 TEE



CROSS



PLATE 42 Y BRANCH



PLATE 43 REDUCER



PLATE 44 NCREASER



PLATE 45 SPLIT TEE



PLATE 46 SPLIT SLEEVE

Weights and Prices on application.



PIPE CUTTING AND THREADING



DIAGRAM SHOWING SCREWED VALVES AND FITTINGS

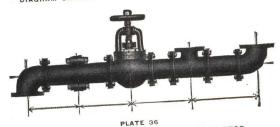


DIAGRAM SHOWING FLANGED VALVE AND FITTINGS

We are equipped with the most improved facilities for cutting, threading and ting all sizes of pipe to sketch.

In laying out work of this kind great care should be taken in making sketches. All measurements should be given center to center, as shown in above diagrams. It is also necessary to know for what purpose the pipe is to be used and pressure required to stand.

PRICE FOR CUTTING AND THREADING PIPE

		2/	16	3/4	1	11/4	1 1/2	2
1/8	1/4	2/8			00	08	.10	.14
.06	.06	.06	.06	.06	.00	.00		
	0	2.1/	4	4 1/2	5	6	7	8
2 1/2	3	3 72			60	90	1.10	1.20
.20	.30	.40	.40	.50	.00			
9	10	12	14 0. D.	15 o. D.	16 o. d.	18 o. d.		
				7 50	10.00	20.00		
	2½	.06 .06 2½ 3 .20 .30 9 10	$ \begin{array}{c cccc} 3 & .06 & .06 & .06 \\ \hline 2 \frac{1}{2} & 3 & 3 \frac{1}{2} \\ .20 & .30 & .40 \\ \hline 9 & 10 & 12 \\ \hline \end{array} $.06 .06 .06 .06 .21/2 3 31/2 4 .20 .30 .40 .40	78 74 78 76 .06 .06 .06 .06 .06 2½ 3 3½ 4 4½ 4½ .20 .30 .40 .40 .50 9 10 12 14 15 0. D. 0. D. 9 .25 .75	½ ¼ 28 ½ .06 .06 .06 .06 .06 2½ 3 3½ 4 4½ 5 .20 .30 .40 .40 .50 .60 9 10 12 ¼ 15 16 0. D. 0	½ ½ ½ ½ ¼ ½ 3 0	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$

Running Threads per inch are based on above list of threading. Each additional inch takes price of an extra thread,

VARIOUS METHODS OF ATTACHING **FLANGES** PIPE TO



SCREWED JOINT



SHRUNK AND ROLLED JOINT



VAN STONE JOINT

SCREWED JOINTS

A method of attaching a flange provided with threads to the end of a pipe provided with threads, by screwing on the flange by machinery until the pipe extends beyond the ace of the flange, then swinging pipe in a double ended lathe and facing off both ends of pipe and at the same time taking a skim off the face of the flanges to insure a true bearing of gasket on end of pipe and parallelism of flanges.

This joint is adaptable for medium steam pressures and high water pressures in sizes up to 12 inches.

SHRUNK AND ROLLED JOINTS

For pipe sizes 14-inch and larger and for pipe where the thickness of wall of pipe was too light for successful threading, the only practical method of attaching flanges was by riveting or shrinking and piening, as there were no threading facilities capable of taking care of the larger sizes, for many years, except by chasing the threads, which was too expensive for ordinary use.

These methods have been superseded naturally by the shrunk and rolled joint, whereby the flange is bored out to a shrink fit, then heated and placed on the pipe. after which the pipe is expanded by a large power roller expander until it not only fits the barrel of the flange but the metal of the pipe flows into the corrugations in the hub of the flange as shown. The pipe is then swung in double ended lathe and both flange and pipe faced off parallel.

This type of joint was used very successfully on high pressure steam, exhaust and other low pressure service, but the advent of the Vanstone joint has superseded it for high pressure steam service, as it is a better and safer job, eliminating the chances of leaks between the flange and pipe. Now the shrunk joint is used mostly on exhaust, condenser and water lines.

VAN STONE JOINTS

The only first-class commercial joint within the reach of all in cost and absolutely dependable, requiring no attention or renewing, beyond an occasional gasket.

dependable, requiring no attention of renewing, beyond an occasional gasket.

It is made by rolling over the end of the pipe, in front of the flange, until at right angles to axis of pipe. This lap is then faced on front and edge and acts as bearing for gasket in making the joint. This joint can be used in connection with a flange of a valve or fitting as well as two pieces of pipe. The flanges act merely as two swivelling collars to hold the pipe together, the flanges permitting turning for matching fitting, valve or other flanges in any position.

The Vanstone joint is adaptable for all classes of service, including steam, gas, and the flanges are the properties of th

and water, for pressures up to 1,000 pounds. It can be furnished, male and female.

when required.



WROUGHT IRON COLUMNS

Cheaper than brick Piers and taking up only one-tenth as much room. Special flanges to order at short notice.



PLATE 3375

Table of Safe Loads in Tons of 2,000 Lbs. Ends of Column Fixed. Factor of Safety.

STANDARD PIPE

	3	DIA	IADA	IND		Name .					- 0
ength in feet	Size Pipe Inches	2	$2\frac{1}{2}$	3	3 1/2	4	4 1/2	5	6		-8
8 10 12 14 16 18 20		1.8	$2.8 \\ 2.4 \\ 2.01$	4.08 4.3 3.8 3.36	6.07 5.52 5.1 4.47	7.67 7.1 6.56 6.02	9.32 8.69 8.16 7.52	9.93 9.33 8.6	14.06 13.82 13.50 13.03 12.37 11.75	18.58 17.9 17.2 16.5	23.1 22.4 21.7 20.8

EXTRA HEAVY PIPE

T th in foot	Size PipeInches		3 1/2		4 1/2	5	6	7	8
8 10 12 14 16 18 20		5.7	6.29 5.57 5.1 4.6 4.	8.2 7.57 6.78	9.2 8.42 7.7	9.58 9. 8.15 7.42	14.57 13.82	16.02 16.17 15.43	19.8 19.1 18.5

PRICES OF PLAIN SQUARE COLUMN FLANGES (No THREADS)

PRICES OF	PLAIN	SGUA	INE C	OLO III.				0
Size PipeInches	1 1/4	11/2	2	2 1/2	3	4	9	- 0
Size Plate	1 × 1	4 x 4	4 x 4	5 x 5	5 x 6½	6 x 8	$7\frac{1}{4} \times 9\frac{1}{2}$	8½x10½
Size Plate		72.2		10	.23	.36	. 61	.88
Price	.07	.09	.12	.16	. 20	,00	1	

WROUGHT HEADERS



PLATE 28

One-piece Wrought Header. Nozzles Welded on Pipe. Flanges Welded on Nozzles



PLATE 29

14-inch Wrought Header with Cast Steel Nozzles riveted on.

LONG TAPER THREADS

GAUGED FOR FLANGED JOINTS

SizeInches	2	$2\frac{1}{2}$	3	4	5	6	8	10	12
Each	.21	.30	.45	. 60	.90	1.35	1.80	3.75	5.25

BENDS WROUGHT IRON PIPE ALSO MADE IN BRASS.



OFFSET BEND.



PLATE 4 QUARTER BEND.



PLATE 5 CROSSOVER BEND.



PLATE 6 GOOSE-NECK BEND.



PLATE 7 U BEND.



PLATE 8



PLATE 9 OFFSET BEND



PLATE 10 U AND QUARTER BEND



OFFSET AND QUARTER BEND



PLATE 12 U AND QUARTER BEND



PLATE 13 EXPANSION U BEND We bend Conduit Pipe to special shapes and angles, as desired.



PIPE BENDS

The table shown on this page gives the advisable radius and least radii to which tandard thickness pipe may be bent.

If the radius must be reduced from the minimum given in the table, the thickness of the pipe must be increased. For such bends it is best to submit sketch.

The straight length between the bends is of advantage to the pipe Bender.

With the welded flanges there must be a short straight length of pipe adjacent to each flange. On sizes under four inches this should equal, at least, one and a half diameters. On sizes over four inches it should equal, at least, one diameter of the pipe. In all cases it is better if equal to two diameters of straight pipe.

Where necessary we can bend to minimum radius given, but prefer to use not less than the average.

We can always bend to a greater radius than given.

Extra heavy pipe can be bent to a shorter radius than Standard Pipe, but the bends are stiffer.

Dia	meter of Pipe	Minimum Radius	Average Radius	Length Tangents
I. D.	O. D.	R	R	L
2" 2 ½" 3" 3 ½" 4"		4 ½" 6"	8"	3"
2 1/2"		6"	9"	4"
3"		8"	12"	4" 5" 5"
3 1/2"		10"	14"	5"
4"		14"	18"	5"
4 1/2"		16"	20"	6"
5"		20"	2' 3"	6"
6"		2' 0"	2' 9"	8"
7"		3' 0" 3' 4"	3' 4"	8"
4 ½" 5" 6" 7" 8"		3' 4"	2' 3" 2' 9" 3' 4" 3' 6" 4' 2" 4' 8"	8"
9"		4' 0"	4' 2"	9"
10"		4' 4"	4' 8"	10"
12"		4' 0" 4' 4" 5' 6" 7' 0"	6' 0"	12"
	14"	7' 0"	7' 6"	12"
	15"	7' 0"	7' 6"	12"
	. 16"	7' 6"	8' 0"	12"
	18"	8' 6"	9' 6"	18"
	- 20"	9' 6"	10' 0"	18"
	. 22"	10' 6"	11' 0"	18"
	24"	11' 6"	12' 0"	18"

PIPE COILS



PLATE 14 SPIRAL COIL NO. 1



PLATE 15 SPIRAL COIL NO. 2



PLATE 16 SPIRAL COIL NO. 3



PLATE 17 SPIRAL COIL NO. 4



PLATE 18
NESTS OF ROUND COILS



PLATE 19 FLAT WORM COILS



PLATE 20 SOAP BOILING AND KETTLE COILS



PLATE 21 FLAT WORM COILS

PIPE COILS



PLATE 22
WALL COILS
WITH MANIFOLDS



PLATE 23
WALL COIL
WITH RETURN BENDS



PLATE 24

DRY ROOM COIL

WITH WROUGHT IRON HEADER OF EXTRA HEAVY
PIPE, TAPPED OR CAST IRON MANIFOLDS



PLATE 25
WALL COIL WITH PITCH
RETURN BENDS



PLATE 26 BOX COIL



PLATE 27 STOVE COIL



PRICE LIST AND CLASSIFICATION OF MALLEABLE IRON FITTINGS

Adopted June 5, 1907 Plain, or Banded

SUPERSEDING ALL PREVIOUS CLASSIFICATIONS

Class	A	В	C
Black Per Pound GalvanizedPer Pound	.40 .50	.20 .28	.13 .20
	Inches	Inches	Inches
Chandelier Hooks. Chandelier Loops. Elbows. Elbows, Reducing. Elbows, 45° Elbows, R. and L. Elbows, Street. Elbows, Street. Elbows, Side Outlet. Elbows, 60° Elbows, 22½° Elbows, Drop. Extension Pieces. Locknuts. Pump Rod Sockets. Return Bends. Return Bends. Return Bends. R. and L. Tees. Tees, Reducing. Tees, Reducing. Tees, Reducing. Tees, Reducing. Tees, Reducing. Tees, Side Outlet. Tees, Drop. Tees, Sarvice.	1/8 1/4 x 1/8 - 3/4 x 1/8 1/4 x 1/8 - 3/4 x 1/4 1/4 - 3/4 x 1/4 1/4 x 1/4 - 1/4 x 1/4 1/4 x 1/4 - 1/4 x 1/4 1/4 x 1/8	\(\frac{1}{4} \) to 1 \(\frac{1}{4} \) to 1 \(1 \) and smaller \(\frac{1}{4} \) to 34 \(\frac{1}{4} \) to 34 \(\frac{1}{4} \) to 34 \(\frac{1}{4} \) to 1 x 34 \(\frac{1}{4} \) All sizes \(\frac{1}{4} \) All sizes \(\frac{1}{4} \) -\(\frac{1}{2} \) x 34 \(\frac{1}{2} \) x 35 \(\frac{1}{2} \) to 2 \(\frac{1}{2} \) All sizes \(\frac{1}{2} \) All sizes \(\frac{1}{2} \) All sizes \(\frac{1}{2} \) to 1 \(\frac{1}{2} \) 36 \(\frac{1}{2} \) and 1 \(\frac{1}{2} \) 37 \(\frac{1}{2} \) and 1 \(\frac{1}{2} \) 38 \	1¼ and larger 1¼ and larger 1¼ and larger 1 and larger 1 and larger 1¼ and larger 2¼ and larger 2¼ and larger
Tees, Male Outlet		All sizes	
Wall PlatesY's, 45°			

Such fittings in Class C as have one or more openings smaller than ¾ to be Class B,

The run of tees gives the sizes for the purpose of classification; the outlet being larger does not change it.

In ordering be particular to state whether plain, or banded.

An extra charge will be made for fittings not enumerated in standard list.

R. and L. fittings not classified take one class higher than right hand.

Fittings 41/2 inch and larger, special discount.



MALLEABLE IRON FITTINGS PIECE PRICE

SizeInches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	31/2	4
Flbows	.06	.07	.08	.10	.15	.22	.25	.35	.50	.90	1.50	2.25	3.00
E bows, 45°		.08	.10	.12								3.25	4.50
Elbows, Side Outlet			.08					.60	1.00				
Street Elbows		.10				.25				1.50	2.25		3.50
rees	.07	.08	.09		.15			.45			1.70	2.50	3.40
Tees, Side Outlet			.12		.20			.80	1.25				
Crosses		.09	.10	.16		.30	.40	.60	1.00	1.75	3.00	3.25	5.25
Drop Tees, F. & M. & F.		.06	.08	.12	.20	.25	* * * *						
Caps			.10	.14	.22	.30	10						
Reducers		.03	.04	.05	.08		.16					1.00	
Extension Pieces	8.838		.06	.07	.10	.16		.28	.45			253	
Couplings, R. & L	.04	.04	.06	.08	.12	.16	.25	.36					
Couplings, Rgt., Hex	.01	.04	.00	.10	.15		.30						
Couplings, Rgt., Pl'n		.03	.05	.07	.10	.14	.20						
Lock Nuts	.02	.02	.03	.04	.05		.09		.18			(100,000,000,000	
Waste Nuts		.04	.05	.06		.10	.15	.25		.40			
Wall Plates			.12	.16									
Chandelier Hooks.		10101	.10	.12									
Return Bends, Open				.20	.30	.50		.85	1.25	2.00	3.00		5.00
Return Bends, Close				.18	.25	.35	.50	.75		1.75			
Return Bends, Med				.18	.25	.35	.50	.75					
l's				.40	.50	.60	.80	1.00	1.70		4.00		5.50

GALVANIZED MALLEABLE IRON FITTINGS PIECE PRICE

MALLEABLE IRON FITTINGS

CLASSIFICATION

Beaded Fittings Same Classification as Banded.







PLATE 201



PLATE 202

ELBOWS.		
	Size	Class
Plain Plain Plain Banded and Plain	1/8 1/8 1/8 1/8 1/8 1/8 1/8 1/8 1/8 1/8	Class A A B B A B B B B B B B C C C C C C C C
Banded Banded Banded Banded Banded Banded	2 ½ x2 2 ½ 3 x1	000000
Banded.	3 ½x2 3 ½x2 ½ 3 ½x2 ½ 3 ½x3 3 ½ 4 x3 4 x3 ½ 4	000000000000000000000000000000000000000
Banded. Banded. Banded. Banded.	5 6	0000

FLAIL LOL	
45° ELBOWS. Size	Class
Plain	A B B B B B B B C C C C C C C
Banded	C
$\begin{array}{ccc} & \text{Size} \\ \text{Banded and Plain} & 1 \frac{1}{4} \\ \text{Banded} & 1 \frac{1}{2} \\ \text{Plain} & 2 \end{array}$	Class B B B
11¼° ELBOWS. Size Banded	Class C
22½° ELBOWS. Size Banded2½	Class



PLATE 203 STREET ELBOWS.

												Size	
Banded.												1/8	
Banded.													
Banded.													
Banded.													1/
Banded.													/2
Banded.					ï	×	÷		٠	٠	٠	24	2 /
Banded.	×	*				¥	è	è		٠	٠	TX	/4
Dandod												11/1	1/
Bandad								-0		100		1 74 X I	72
Banded.							,					1/4X1	



MALLEABLE IRON FITTINGS CLASSIFICATION. CONTINUED

Beaded Fittings Same	Classification as Banded.
STREET ELBOWS—Continued.	
Banded. Size Class Banded. 114x 34 C Banded. 114 C	DROP ELBOWS. Male and Female.
Banded 11½x 34 C Banded 11½x1 C Banded 11½x14 C Banded 1½ C Banded 2x1 C Banded 2x1½ C Banded 2x1½ C Banded 2x1½ C Banded 2x1½ C	PLATE 206 Plain. 14x 3% B Plain. 3x 3x B Plain. 12x 3% B Plain. 12x 3x B DROP ELBOWS.
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Flange Right Side. Size Class Plain 1/4 x 3/4 B Plain 3/4 x 3/8 B
45° STREET ELBOWS.	DROP ELBOWS.
Banded. Size Class Banded. ½ 5 Banded. 3 4 B Banded. 1 4 B Banded. 1 4 B Banded. 1 4 B Banded. 1 4 B	Flange Left Side. Plain
Banded	Male and Female. With Drop 2½ In, Long.
ELBOWS.	PLATE 207
Side Outlet.	Plain. Size Class 14x 3/8 B Plain. 3/8 3/8 B
Plain	ROUND FLANGE DROP ELBOWS.
Plain	Female. Size Class Plain 14
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	
DROP ELBOWS.	PLATE 208 TEES PLATE 209
Female.	In describing Tees the run is first named, then the outlet, thus:
Plain Size Class Plain 34x 14 B Plain 38x 14 B Plain 38x 34 B Plain 14x 34 B Plain 14x 34 B Plain 5x 12 B Plain 34x 34 B Plain 34x 34 B Plain 1 x1 B	Plain



FITTINGS IRON MALLEABLE

CONTINUED CLASSIFICATION.

Beaded Fittings Same Classification as Banded.

Beaded Fittings Same Cla	assification as Banded.
Beaded Fittings Same	TEES_Continued.
TEES—Continued.	Size
	11/x1 x1½ C
Size	Size
Banded and Plain1 4x1 x 1/2 Banded and Plain1 1/x1 x 3/4	$egin{array}{cccccccccccccccccccccccccccccccccccc$
Banded and Flam 11/x1 x1	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
No. 18 Acres 10 Tests	



MALLEABLE IRON FITTINGS CLASSIFICATION. CONTINUED

CLASSIFICATION. CONTINUED
Beaded Fittings Same Classification as Banded.

		-	 FFT
in			

	Continued	
_	Size	Class
Banded	91/201/201/	
		č
Banded	2 72 -0	č
Banded	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	č
Danded	9 -0 4	č
Banded	2 -2 X1	C
		C
Banded	X3 X1½	C
Banded	3 x3 x2	Č
Banded	$x_2 x_2 x_3 x_3 x_2 x_2 x_2 x_3 x_3 x_2 x_2 x_2 x_3 x_3 x_3 x_3 x_3 x_3 x_3 x_3 x_3 x_3$	C
		C
Banded	$3\frac{1}{2}x3\frac{1}{2}x1$ $3\frac{1}{2}x3\frac{1}{2}x1\frac{1}{4}$	C
Banded	$3 \frac{1}{2} \times 3 \frac{1}{2} \times 1 \frac{1}{4}$	C
		C
		C
		C
		C
		C
		Č
Danded	4 -4 112	C
Danded	4 **4112	Č
рациен	11 -0	Č
		Č
Danded	4 24 29	C
Danded	4 -4 01/	C
Banded	1 -1 10/2	č
Danded	41/41/ 41/	G
		S.
Banded	\dots 6 x6 x2	C
Banded		0
Sanded	C C 0	000000000000000000000000000000000000000
Banded	C C - 4	C
Banded	6 x6 x4	C
Banded	$\dots \underline{6} \underline{x6} \underline{x6} \underline{x6}$	C
CHARLECUL	7 ×7 ×7	(1



DROP TEES.

Female.

PLATE 210

DI:	Size	Class
Plain	1/4 x 1/4 x 1/4	В
1 121111	3/8X 1/4X 1/4	B
riain	3/8X 3/8X 1/4	B
riam	3/8X 3/8X 3/8	B
Plain	12- 12- 13	B
Plain	1/ 9/ 12	B
riain		
Plain	7 0 / 8	В
Plain	124 /4	В
Plain	22 /22 /8	В
Plain	12X 12X 12	В
Plain	34X 1/2X 1/4	В
Plain	/4X /9X %	В
Plain	34X 34X 14	В
Plain	34X 34X 38	В
riain	34X 34X 1/3	В
Plain	34X 34X 34	B
Plain1	X 34X 38	B
Plain	x1 x 3%	B
Plain	1 10	B
Plain 1	x1 x 32 x1 x 34	B
Plain 1	x1 x1	B

LONG DROP TEES. Male and Female.



DROP TEES

Male and Female.

21.1									5	Size		Clas
Plain									LIX	1/1 x	3/	B
									3/8X	1/1 X	3%	B
12(11)									3/8X	3/8X	3%	B
. 124.111									1/2X	3/8X	3/8	B
rain.									1/2X	1/2X	3/8	В
Tain.									34 X	1/2X	3/8	В
Plain	٠		×	ä					34X	34 X	3/8	В
Tain.								1	X	34 X	3/8	B
Plain.	٠	٠						.1	X	1 x	3/8	B



SERVICE TEES.

PLATE 212

	D	Size	Class
	Banded	1/9X 3/8X 1/9	В
	Banded	1/2X 1/2X 1/2	B
	Banded	3/- 1/- 27	B
	Danded	3/1 3/10 3/	B
ı	Banded1	X 34X 34	B
ı	Banded1	x 34x1	B
ı	Banded1		
ı	Banded1	x1 x 3/4 x1 x1	G
I	Banded1	1/- 2/ 11/	C
I	Banded1	74X 74X174	C
ı	Banded1	14x1 x1	C
ı	Banded	14x1 x114	C
ļ	Banded1	4x14x1	0000000
ı	Banded1	4x14x14	C
ı	Banded1	$\frac{1}{2}$ X $\frac{3}{4}$ X $\frac{3}{4}$	C
ı	Banded1	½x ¾x1	C
ı	Banded1	1/2X 3/4X11/4	C
	Banded1	$\frac{1}{2}$ x1 x1	C
	Danded	1/2211/ 9/	C
	Banded1	1/2x 3/4x11/2	C
	Banded.	1/2 1 x117	C
	Banded	1/2×1 1/4×1 1/2	Č
	Danded 1	1/ov 1 1/ov 1 1/	Č
	Danded	m 3/-11/	č
	Banded 9	v 3/v11/	C
			č
	Banded 2 Banded 2 Banded 2 Banded 2	v1 v2	č
	Banded 2	v11/v2	C
	Banded	71 1/x2	G
	Banded2	x2 x2	o c
	Banded	x2 x2	000000000000000000000000000000000000000
			C
	Banded3	2XZ 1/2XZ 1/2	C
	Banded3	x2 /2x3	C
	-шиниси	X3 X3	()

FITTINGS RON MALLEABLE CONTINUED

CLASSIFICATION.

Beaded Fittings Same Classification as Banded.



SIDE OUTLET TEES

PLATE 213	Size	Class
Plain	3/8	B
Plain		B
Plain		B
Plain	11/	B
Plain,		B
Plain	1 /2	B
Plain		D



CROSSES



_			
			P

PLATE 214	Cina	Class
	Size	B
Banded and Plain	1/4 X 1/4 X 1/4	B
Plain	3/8X 1/4X 1/4	B
Dlain	3/8X 3/8X 1/4 3/8X 3/8X 3/8	B
Banded and Plain	3/8X 3/8X 3/8	B
Plain	1/2X 3/8X 1/4	B
Plain	14x 14x 14 38x 14x 14 38x 38x 14 38x 38x 38 12x 38x 14 12x 38x 38 12x 38x 4 12x 38x 4	B
Plain	1/2x 1/4x 1/4	B
	1/2X 1/4X 1/4 1/2X 1/2X 1/4	B
Banded and Plain	1/2X 1/2X 1/8	B
Banded and Plain	1/2X 1/2X 1/2	B
Plain	3/8X 3/8X 1/2	B
Plain		В
Plain		B
Plain Plain	3/4 x 3/4 x 3/4	B
Banded and Plain	34x 34x 1	B
Banded and Plain Banded and Plain	34x 34x 3	B
Banded and Flam	1 x 34x 1	$\frac{1}{2}$ B
Banded and Plain	. 94X 44X 1 .1 x 34x 1 .1 x 34x 3 .1 x1 x 3	B
Banded and Flain	1 x1 x 3	8 B
Banded and Flam	1 x1 x 1	2 B
Banded and Plain	1 x1 x 3	B B
Banded and Plain	1 x1 x1	B
		4 C
Banded Banded and Plain Banded and Plain	11/v1 x1	C
Banded	11/x11/x	8 B
Banded and Plain	11/x11/x	L B
Banded and Plain	11/x11/x	C C
Banded and Plain	11/x11/x1	C
Banded and Plain	11/x11/x1	1/4 C
Banded and Plain	11/x11/x1	1/4 C
Banded and Plain	11/x11/6x	3/8 B 1/3 B
Banded and Plain.	11/x11/x	13 B
Banded and Plain Banded and Plain Banded and Plain	1 1/x 1 1/x	34 C C 14 C 1/2 C
Danded and Til.	11/v11/6x1	
Banded and Plain Banded and Plain	1 1/x 1 1/5x 1	1/4 C
Banded and Flam	* 1 1 7 1 1 7 mm 1	1/2 C
Banded and Plain Banded and Plain	9 v2 x	3/8 B
Banded and Plain.	v2 x	1/2 B
Banded and Plain.	9 v2 x	1/2 B 3/4 C
Banded and Plain.	9 v2 x	C C
Banded and Plain Banded and Plain Banded and Plain Banded and Plain Banded and Plain	4 14 1	

assilication as Danded.	
CROSSES—Continued	
Size Class	
Banded and Plain2 x2 x1¼ C	
Banded 21/x21/x11/2 C	
Banded	
Banded	
Banded	
Banded	
Banded 3 $x3$ $x2\frac{1}{2}$ $x3$ $x3$ $x3$ $x3$	
Banded	
Banded	
Banded 4 X4 X2/2 C	
Banded C	
Banded	
Bonded C	
Banded 6 x6 x6 C	



CAPS.

				CII.
and an income the same			Size	Class
PLATE 216			1/	A
Plain	 5		. 18	B
Plain	 		. 74	B
Plain	 		1/4	B
Plain	 		37	B
Plain	 		1 4	В
Plain	 	******	114	C
Dlain			· 1/4	C
Plain	 		2	000000
				C
Dlain			4 / 4	C
				C
Dandod			/ 2	Ċ
Dandod	announced as a			C
Banded	 			
				A STATE OF THE PARTY OF THE PAR



REDUCING COUPLINGS.



		PLA	١	E,	210
TE	217	Sizo		C	lass

1	PLATE 217	.35		Class
١		Size	1/	Δ
1	Banded and Plain	. 14X	18	A
٨			78	В
1	Banded and Plain	3/8X	1/4	
١	Banded and Flam	16x	1/1	B
4	n 1.1 and Philli	. /	3/	B
1			18	B
	Banded and Plain	. 34 X	/4	
	Banded and Flam.	3 1 X	3/8	\mathbf{B}
	Banded and Plain	3 / v	1/6	B
	To 1 1 and Plain	. /4	17	B
	n 1-1 and Plain,			B
	Banded and Plain	.1 x	9/8	
	Banded and Flain	1 x	1/2	B
	Banded and Plain	1 x		B
				B
	Banded and Flam.	1 /4×	14	10
	Banded			



MALLEABLE IRON FITTINGS CLASSIFICATION. CONTINUED

CLASSIFICATION. CONTINUED
Beaded Fittings Same Classification as Banded.

Beaded Fittings S	ame (Classification as I	Banded.	
REDUCING COUPLINGS-Contin	ued	i i		
	Class			
	В	CO	UPLINGS	/ Land
Banded and Plain. $1\frac{1}{4}$ x $\frac{3}{8}$ Banded and Plain. $1\frac{1}{4}$ x $\frac{1}{12}$	В	A STATE OF THE PARTY OF THE PAR		
Banded and Plain	C	I I I I I I I I I I I I I I I I I I I	Right Hand	
Banded and Plain11/4x1	C			
Banded and Plain	B	DIATE COS		
Banded and Plain $1\frac{1}{2}$ $1\frac{1}{2}$ Banded and Plain $1\frac{1}{2}$ $1\frac{1}{2}$	B	PLATE 220	· Cr	PLATE 22
Banded and Plain	č	Plain	Size	
Banded and Plain 11/5x11/4	č	Plain and Band	lod 1/	A B
Banded and Plain 2 v 1/2	B	Plain and Band	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	B
Banded and Plain 2 x 34	C	Plain and Band	led 1/a	В
Banded and Plain 2 x1	C	Plain and Band Plain and Band	led 34	В
Banded and Plain 2 x1¼ Banded and Plain 2 x1⅓	C	Plain and Band	led1	00000
Banded and Flam 2 x1½ Banded	C	Plain and Band	led	C
Banded 9 1/8 1 1/4	č	Plain and Band	ed	C
Banded	Č	Plain and Band	ed 21%	č
Banded $2\frac{1}{2}x2$	C	Plain and Band Plain and Band Plain and Band	ed3	Č
Banded3 x1	C	Plain and Band	ed4	Č
Banded3 x1¼	C			
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	C		T OOLZ M	TITO
Banded	č		LOCK N	UTS.
Banded	č			
Banded	C	PLATE 222	Size	Class
Banded	C	Hexagonal		A
Banded4 x1	C	Hexagonal		В
Banded	C	Hexagonal		B
Banded4 x2	č	Hexagonal		B B
Banded 4 x2½	č	Hexagonal		B
Banded 4 x3	C	Hexagonal		В
Banded 4 x3½	C	Hexagonal		C
Banded $4\frac{1}{2}x4$	C	Hexagonal	2	C
		Hexagonal	$\dots \dots 2\frac{1}{2}$	C
COUPLINGS		Hexagonal	31/	CCCC
		Hexagonal	4	č
Right and Left.	1		STE NUTS	
PLATE 219			William Control of the Control of th	
	ass			
Plain	B	************	3 8 B	_
Plain	В		1/2 B	
	В	***********	34 B	Tial I
	BC	**********		
	č			
Plain	č			LATE 223
Plain	Č	-		A STATE OF THE STA
Plain	C		WALL PLA	TES.
	C		S	ize Class
COUPLINGS—Hexagon. Right and I	eft			3/8 B
Size CI	ass	PLATE 224		$\frac{1}{2}$ B
	В	EXTENSION P		
	В		3/8X	3/8 B
	B B		1/2X	1/2 B
	C C			34 B
Plain	č			1 B
Plain	c	Distance States	$1\frac{1}{2}x$	1 1/4 B
Plain	C			B B



MALLEABLE IRON FITTINGS

CLASSIFICATION. CONTINUED Beaded Fittings Same Classification as Banded.

CITTA	ATTAI	ELIER	TTOO	TZCI
UTA	NI	VIVIE IN	. 11()()	11.5

	0		1	<i>(</i> 3)	1		1	•		1	11	. 1	4	11	,	1	1		,,	,	IX19.		
ALC: UNKNOWN														L									
																					Size	Class	
THE REAL PROPERTY.								8										×			3/8	В	
11	٠.																				1/2	В	
A M									ł	I	0	M	A	L	E								
9			*	×						*	è	×							×		3/8	\mathbf{B}	
		÷					· i		2	1											1/2	В	
PLATE	22	26	6																				
				C	I	Ι	A	I	V	D)]	E	I	I	F		R		Ι	(OOPS		

		()	E	L	1	N		D	F		1		E	R	1]	L	O	OPS	
A									7	VI	A	I	E						4	Size	Class
					×			•								ė				3/8	В
								:	•			è	٠	٠					*	1/2	В
								1	ŮT.	7.7	15	A	T	E							

PLATE 227



Y BRANCHES.

PLATE 228	
Size	Class
Banded	В
Banded 3/8	B
Banded and Plain 1/2	\mathbf{B}
Banded and Plain 34	\mathbf{B}
Banded and Plain 1	B
Banded 1 x 3/4	B
Banded and Plain14	B
Banded and Plain14x1	B
Banded and Plain11/2	B
	B
Banded and Plain1 ½x1	
Banded $1\frac{1}{2}$ x $1\frac{1}{4}$	В
Banded and Plain2	В
Banded and Plain2 x1	\mathbf{B}
Banded 2 x1½x1½	B
Banded 2 x11/4	B
Banded and Plain2 x1½	B
Banded	B
Banded $2\frac{1}{2}x2$	B
	B
Banded	
Banded $3 \times 2\frac{1}{2}$	1.7
Banded4	В
Banded5	В
Banded6	\mathbf{B}

60° V BRANCHES

	,	,,	9			7			•	_		-		1		_				S	ize	Clas
Plain							ė	e												1	1/2	B
Plain		٠		٠	٠		9		00		•		٠	e e			•	8		2	-117	В
Plain		٠	•				's		٠	*		٠		*		i.	*	*	4	2	$x1\frac{1}{2}$	D

DOUBLE Y BRANCHES.

													S	fize	Class
Plain				7.										1/2	В
Plain													٠.	34	В
Plain												٠	. 1		B
Banded	a	n	d		P	l:	1	II	1.				, 1	1/2	B
Banded	a	n	d		Ρ	ŀ	1	ir	١.				. 2	3	B



RETURN BENDS

CLOSE PATTERN.

PLATE	22	9	Distance Between	R. H.	R. & L
		Size	Centers	Class	Class
lain	14/14		7/8	A	A
lain		. 1/2	1	В	A
lain		. 34	1 1/4	В	В
lain		. 1	1 1/2	В	B
lain		. 11/4	1 34	C	B
lain		. 11/2	$2\frac{3}{16}$	C	B
Plain		. 2	258	C	В



MEDIUM PATTERN.

	Distance		
PLATE 230	Between	R. H.	R. & L.
Size	Centers	Class	Class
Banded ½	1 1/4	В	A
Banded 34	1 1/2	\mathbf{B}	В
Banded1	178	В	В
Banded $1\frac{1}{4}$	$2\frac{1}{4}$	C	В
Banded $1\frac{1}{2}$	$2\frac{1}{2}$	C	В
Banded2	3	C	В



OPEN PATTERN.

PLATE 231 Size	Distance Between Centers	R H. Class	R. & L. Class
Banded 3/8	1 3/8	В	A
Banded $\frac{1}{2}$	1 1/2	В	A
Banded 34	2	В	В
Banded1	21/2	В	В
Banded $1\frac{1}{4}$	3	C .	В
Banded $1\frac{1}{2}$	3 1/2	C	\mathbf{B}
Banded2	±	C	В
Banded 2 1/2	4 1/2	C	В
Banded3	5	C	В

COCK WRENCHES





PLATE 233
Special Prices on application

MALLEABLE IRON FITTINGS

CROSS-OVERS AND CROSS-OVER TEES

MALLEABLE IRON GALVANIZED

Flat Band Cross-Overs same Lists as Beaded







PLATE 235A
CROSS-OVER WITH OUTLET
Back Outlet same size as Run.



PLATE 236A CROSS-OVER TEE

CROSS-OVERS

			CR	oss.	OV	ERS	V	V۱	ГН	(OL	T	LE	т				
men	to Cross	1 /4	inen	Pipe.												 	 .each	5
inch	to Cross	1 4	inch	Dipe.								50.50				 1 × 5	 . each	
inch	to Cross	3/	ingh	Dino										2 2 2	\times \times	 D 00 0	 .each	
1/2 inch	to Cross	11/4	inch	Pipe											5.5	 * *	 . each	1 .
2 11101	to Cross	/2	inch	Pipe.								0.0	720.20	este is	0.0		each	d .:

1/	inch	to Cross	1/2 inch	Pipeeach	00
3	inch	to Cross	34 inch	Pipe each	.20
1	inch	to Cross	1 inch	Pipe	.39
*	HILLII	00 01000	T HIGH	ripe each	60

CROSS-OVER TEES

1/		C	1/		DI .	-
1/9	inch to	Cross	1/2	inch	Pipeeach	00
37	inch to	Cross	37	inch	Pipe	.38
/4	men to	CIUSS	/4	men	ripe	56
1	inch to	Cross	1	ingh	Pine	.00
	men co	C101313	1	men	- ipe each	86

CALVANIZED WASH TRAY FITTINGS



PLATE 237A TEE



PLATE 238A ELBOW, R. H.

							_		 - ,					
Cees, ½ inch, Standard Le	engths											-	oo ob l	
ees, ½ x ¾ inch, Standar	ed Langthe	* * *	0.00		 	 			 		4.5		.eacn	
ees 1/2 inch Extra Long	d Dengths	X X X	*****		 				 a e		2.5		.each	
ees, ½ inch, Extra Long.				10 P	 	 				2. 8	•0.0		.each	
Ills, 34 inch, Right or Left	t	45 50 10											onoh	
		0.000			 	 		0.00					caem	



MALLEABLE IRON BUSHINGS



PLATE 5325 MALLEABLE BUSHING



PLATE 5326
MALLEABLE FACED BUSHING

SizeInches	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4	1/2	5
Bushingseach Bushings, Galveach Faced Bushingseach	-				10	1 4	10	90	19				250	20	5 20

CIRCULATING BOILER FITTINGS

MALLEABLE IRON

GALVANIZED



PLATE 5327



PLATE 532B



PLATE 5329

SizeInches	Female, Male	Female, Male $\frac{3}{4}$ x $\frac{1}{2}$ x1	Female, Male
Boiler Elbows, Galvanized	.40 .75 .40	.40 .75 .40 .75	.40 .60 .40 .60

To avoid mistakes, particular care should be used in making orders quite clear for the above fittings.

MALLEABLE UNIONS



PLATE 7803

SizeInches	18	1/4	3/8	1/2	34	1	1 1/4	$1\frac{1}{2}$	2	212	3	3 1/2	4
Blackeach Galvanizedeach	.18 .27	.18	.20 .30	.22	.27	.33	.46 .70	.58 .90	.75 1.15	1.55 2.35	$\frac{2.10}{3.15}$	3.65 5.50	4.35 6.50

RHODE ISLAND UNIONS

WITH BRONZE SEAT

GUARANTEED FOR 300 POUNDS PRESSURE FOR STEAM, WATER, GAS AND OIL



PLATE 7804



PLATE 7805

SizeInches	1/8	1/4	3/8	1/2	3/4	1	11/4	1 1/2	2	21/2	3
Plain Union each Galvanized Union each											

PLATE 7804 UNIONS

		~	AITD	LEINIA	LE	ONION	15	
SizeInches	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Blackeach Galvanizedeach	.38 .53	.50	. 62	.75 1.05	1.00	1.50	2.00	2.50

PLATE 7805 MALE AND FEMALE UNIONS



DART'S UNIONS

PLATE 5321



PLATE 5321

PLATE 5322

Size	3/8	1/2 3/4	1	11/4	1 1/2 3	2 21	2 3	3 1/2	4
Price, Plain	.40	. 50 . 75 . 90	.80	$\begin{bmatrix} 1.20 \\ 1.80 \end{bmatrix} $. 60 . 40 3 .	$\begin{bmatrix} 00 & 3.2 \\ 00 & 4.8 \end{bmatrix}$	$\begin{array}{c c} 0 & 4.80 \\ 0 & 7.20 \end{array}$	7.20 10.80	10.80 16.20
PLATE 5	5322	FI	ANG	E U	NIOI	NS			
Size	$\frac{1}{2}$	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2
Price	. 55	. 60	. 80	1.20	1.60	2.00	3.20	4.80	6.00
Size	4	$4\frac{1}{2}$	5	6	7	8	9	10	12
Price	7 50	8 75	10 00	12 50	15 00	18 00	21 60	28 80	46 00

UNION COUPLINGS

JEFFERSON UNIONS



PLATE 5323



PLATE 5324

SizeInches	1/8	1/4	3/8 1/3	2 3/4	1	11/4	1 1/2 2	2 21/	2 3	3 1/2	4
Plain each Galvanized each	.30 .45	.30	.40 .5	50 .60	.80	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$.60 2. .40 3.	$\begin{array}{c c} 00 & 3.2 \\ 00 & 4.8 \end{array}$	$\begin{bmatrix} 0 & 4 & .80 \\ 0 & 7 & .20 \end{bmatrix}$	8.00 12.00	10.00 15.00
	PLA	TE	5324	FL	ANG	E U	NION	IS			
Size		Inches	1/2	3/4	1	11/4	$1\frac{1}{2}$	2	2 1/2	3	3 1/2
Black		each	. 55				1.60 2.15				
Size		Inches	4	4 1/2	5	6	7	8	9	10	
Black		each	7.50	8.75	10.00 13.50	12.50 16.90	$15.00 \\ 20.25$	18.00 24.30	21.60 29.15	28.80 38.90	

PLATE 5323 UNIONS



EXTRA HEAVY MALLEABLE IRON FITTINGS

FOR 250 POUNDS WORKING PRESSURE

TESTED TO 2000 POUNDS HYDRAULIC PRESSURE



ELATE 3347 ELBOW



PLATE 3348 45° ELBOW



PLATE 3349 LONG TURN ELBOW



PLATE 3350 TEE



PLATE 3351 CROSS

SizeInches	1/4	3/8	1/2	3/4	1	1 1/4	$1\frac{1}{2}$
Elbowseach	.20	.25	.30	135	.40	. 55	.70
Teeseach	.30	.40	.45	. 50	. 60	.80	1.05
45° Elbowseach	.25	.30	.35	.42	. 50	. 65	.85
Crosseseach	. 60	. 80	.90	1.00	1.20	1.60	2.10
Long Turn Elbowseach					. 64	.80	1.10
Couplingseach	.20	.25	.30	.35	.40	. 55	.70
SizeInches	2	2 1/2	3	3 1/2	4	5	6
Elbowseach	.90	1.50	2 40	3.25	4.25	6.50	9.50
Teeseach	1.35	2.25	3.60	5.00	6.50	9.75	14 25
45° Elbowseach	1.10	1.85	2.85	4.00	5.00	7.50	10.50
Crosseseach	2.70	4.50	7.20	10.00	13.00	19.50	28.50
Long Turn Elbows each	1.60	2.40	4.50	6.50	7.00	13.00	17.50
Couplings each	.90	1.50	2.40	3.25	4.25	6.50	9.50

Long Turn Elbows, $45^{\rm o}$ Elbows, and Crosses reducing sizes, are made to order by bushing in the sand from straight patterns.



MALLEABLE RETURN BENDS

FOR REFRIGERATION INSTALLATION

CONDENSER PATTERN



PLATE 3148

SizeInches	3/4	1	11/4	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Close. each Open each	.60	.70	1.00	1.50	$\frac{2.00}{2.50}$	3.00	5.00

AMMONIA PATTERN



PLATE 3149

Size	3/4	1	11/4	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Each	1.10	1.50	2.00	2.60	3.20	4.50	6 20

For Galvanized double above list.



MALLEABLE IRON EXTRA HEAVY AMMONIA FITTINGS

RECESSED ENDS FOR SOLDERING

Tested to 300 Pounds Air Pressure



PLATE 3521 ELBOW



PLATE 3522 45⁰ ELBOW



PLATE 3523 TEE

1/4	3/8	1/2	3/4	1	1 1/4	1 1/2
. 60	.76	.90	1.04	1.20	1.66	2.10
.84	.90	1.04	1.26	1.50	1.96	2.56
. 90						
1.80	2.40	2.70	3.00	3.60	4.80	6.30
2	2 1/2	3	3 1/2	4	5	6
2.70	4.50	7.20	9.76	12.76	19.50	28.50
3.30	5.56	8.56	12.00	15.00	F-7-1-1	
4.06	6.76	10.80	15.00	19.50	29.26	42.76
8.10	13.50	21.76	30.00	39.00	58.50	85.50
	.60 .84 .90 1.80 2 2.70 3.30 4.06	$ \begin{array}{c cccc} .60 & .76 \\ .84 & .90 \\ .90 & 1.20 \\ 1.80 & 2.40 \\ \hline \\ 2 & 2\frac{1}{2} \\ \hline 2.70 & 4.50 \\ 3.30 & 5.56 \\ 4.06 & 6.76 \\ \end{array} $	2 2½ 3 2.70 4.50 7.20 3.30 5.56 8.56 4.06 0.76 1.07 1.07 1.07 1.07 1.07 1.07 1.07 1.07	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$

HYDRAULIC OR AMMONIA FLANGE UNIONS SEMI-STEEL BRONZE SEAT



PLATE 3524

SizeInches	4	6	8	10
Each	15.00	25.00	36.00	57.60

CAST IRON FITTINGS







PLATE 53. R. AND L. ELBOW



PLATE 54. 450 ELBOW

SizeInche	es 1/4	.3/8	1/2	3/4	1 13	4 1 1/2	2	21/2	3 3 1	2 4
Elbows, R. H Eac							.28		75 1.0	
Elbows, R. and L Eac							.32		85 1.2	
Elbows, L. H Eac Elbows, Reducing Eac	h .00	.06	.07	.09 .			.32		85 1.2	
Elbows, PitchedEac	h	.00	.01				.35		00 1.3	
Elbows, Side Outlet Eac	h		.18	.24 .:	30 .48					5 3.60
45° ElbowsEac	h .06	.06	.07	.10 .	12 .19	. 24	.34	.60 .	90 1.2	5 1.45
		200				1				1
SizeInches	$4\frac{1}{2}$	5	6	7	8	9	10	12	14	15
SizeInches Elbows, R. H Each						9 5 9.00			_	
Elbows, R. H Each Elbows, R. and L. Each	1.75	2.00	$\frac{2.75}{3.40}$	4.7	0 6.7	5 9.00	13.50	20.00	57.00	70.00
Elbows, R. H Each Elbows, R. and L Each Elbows, Reducing . Each	1.75 2.25 2.00	2.00 2.40 2.30	2.75 3.40 3.15	4.7	0 6.7	$ \begin{array}{c c} \hline $	13.50	20.00	57.00	70.00
	1.75 2.25 2.00	2.00 2.40 2.30	2.75 3.40 3.15	4.7	0 6.7	5 9.00	13.50	20.00	57.00	70.00

ECCENTRIC TEES



PLATE 55



PLATE 56

These fittings are designed to prevent the accumulation and lodgment of con-

Orders must be accompanied with sketch, showing position in which the fitting is to be placed.

Prices on application.



CAST IRON FITTINGS







PLATE 58. REDUCING TEE

SizeInches	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Tees Each Tees, Reducing Each Tees, with Side Outlet Each			.09 .10 .27	.12 .14 .36	.15 .17 .45	.23 .27 .70	.29 .33 .90	.41 .47 1.25
SizeInches	$2\frac{1}{2}$	3	31/	4	4 1/2	5	6	
TeesEach Tees, ReducingEach Tees, with Side OutletEach	.83	1.25	1.75				4.60	
SizeInches	7	8	9	10	12	14	15	
Tees Each Tees, Reducing Each Tees, with Side Outlet Each	7.80	11.25	15.00	22.50	33.50	83.00	100.00	



PLATE 59. CROSS



PLATE 60. Y BRANCH

SizeInches	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Crosses Each	.15	.16	.22	.27	.42	.53	.75
Crosses, ReducingEach	.18	.18	.25	. 30	.46	. 60	.83
Y BranchesEach		.20	.28	.34	. 54	.66	.94
Y Branches, ReducingEach		. 23	.33	.40	.62	.76	1.08
SizeInches	2 1/2	3	3 1/2	4	4 1/2	5	6
Crosses Each	1.30	2.00	2.70	3.15	4.60	5.50	7.25
Crosses, Reducing Each	1.45	2.20	3.00	3.50	5.10	6.00	8.00
Y Branches Each		2.50	3.50	4.00	5.90	7.00	9.20
Y Branches, ReducingEach	1.90	2.90	4.00	4.60	6.65	8.00	10.60
SizeInches	7	8	9	10	12	14	15
Crosses Each	12.25	17.50	23.50	35.00	52.50	110.00	130.00
Crosses, Reducing Each	13.50	19.25	26.00	38.50	58.00	120.00	143.00
Y Branches Each		22.50	30.00	45.00	67.00		
Y Branches, ReducingEach	18.00	26.00	35.00	51.75	77.00		

CAST IRON FITTINGS RETURN BENDS







PLATE 61 CLOSE.

PLATE 62 OPEN

PLATE 63 BACK OUTLET

Return Bends, SizeIn.	1/2	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	4 1/2	5	6
Close ea. Open ea. Back Outlet ea.	.25	.26	.30	.40	.00	1.15	2.00	3.00	4.00	0.50	7.00	11.00	10.00
Back Outlet ea. Close, R. & L. or L.H. ea. Open, R. & L. or L.H. ea.													

DIMENSIONS OF RETURN BENDS

DIMENSIO	43	01							-				
Size of PipeInches	1/2	3/4	1	11/4	1 1/2	2	$ 2\frac{1}{2} $	3	$ 3\frac{1}{2} $	4	$ 4\frac{1}{2} $	5	6
Close, Center to CenterIn.	1 1/4	1 1/2	1 3/4	21/4	2 1/2	3 1/4	3 5/8	43/8	5	6	 8	9	10
Open, Center to Center		$\frac{2\frac{1}{4}}{1\frac{1}{2}}$	$\frac{2\frac{1}{2}}{1\frac{3}{4}}$	$\frac{3}{2\frac{1}{4}}$	$\frac{3\frac{1}{2}}{2\frac{1}{2}}$	3 1/4	$5\frac{3}{8}$ $3\frac{5}{8}$	$\frac{6\frac{1}{2}}{4\frac{3}{8}}$					

RETURN BENDS, CLOSE, TAPPED ON PITCH

REIONIA BEIN	00,	0 = 0	,			100			
SizeInches Length of Pipe in CoilFeet	1 3	1 4	1 5	$\begin{vmatrix} 1 \\ 6 \end{vmatrix}$	$\begin{vmatrix} 1\\7 \end{vmatrix}$	8	1 1/4	1 1/4 5	1 1/4
Price Price, Right and Left	.26 .26	.26	.26 .26	.26 .26	.26 .26	.26 .26	.33	.33 .33	.33







PLATE 64. SPECIAL WIDE PATTERN.

PLATE 65. OFFSET

RETURN BENDS, SPECIAL WIDE PATTERN

SizeI	n. 1 3	1 4	1 5	6	1 * 8	1 1/4	$\begin{vmatrix} 1 \frac{1}{4} \\ 6 \end{vmatrix}$	$ \frac{1}{8} ^{1/4}$ *	$\begin{vmatrix} 1\frac{1}{2} \\ 6 \end{vmatrix}$	$\frac{1\frac{1}{2}}{8}$	$\frac{2}{6}$	$\begin{bmatrix} 2 \\ 8 \end{bmatrix}$	8	3
C. to C e Black e Galv e	a45 a90	$\frac{1.50}{1.00}$.60 1.20	.75 1.50	$\frac{1.50}{2.50}$	$\frac{1.00}{2.00}$	$\frac{1.25}{2.50}$	$\frac{2.50}{5.00}$	$\frac{1.60}{3.20}$	$\frac{2.00}{4.00}$	$\frac{2.00}{4.00}$	$\begin{vmatrix} 3.50 \\ 7.00 \end{vmatrix}$	$\begin{bmatrix} 5.50 \\ 11.00 \end{bmatrix}$	$\frac{6.00}{12.00}$

* These sizes are extra heavy.

OFFSETS

SizeInches	3/4	1	1 1/4	$1\frac{1}{2}$	2	21/2	3	3 1/2	4	5	6
To offset 4 incheach To offset 6 incheach To offset 8 incheach	.45	.70	1.00	1.20	1.80	3.00	4.00	5.00	6.00		



CAST IRON FITTINGS







PLATE 66 CAP

PLATE 67 REDUCING COUPLING

PLATE 68 LOCKNUT

SizeInches	1	11/4	1 1/2	2	21/2	3	31/9	4	4 1/2
Capseach Reducing Couplingseach Locknutseach	.16	.14	.20	.26 .43 .25	.40 .60 .27	.54 .80 .34	.75 1.00 .47	.87 1.35 .64	1.05 1.85 .85
SizeInches	5	6	7	8	9	10	12	14	15
Capseach Reducing Couplingseach Locknutseach	2.00		2.50 5.35 1.70	2.85 6.75 2.35	4.75 8.35 2.70	5.50 10.00 3.00	15.00		40.00



BUSHINGS



PLATE 69. BUSHING

PLATE 70. BUSHING, FACED

SizeInches	3/8	1/2	34	1	11/4	11/2	2	21/2	3	3 1/2	4
Bushingseach Faced Bushingseach	.04	.04	.05	.06 .13	.07	.09	.14	.21	.30	.40 1.20	.50 1.50
SizeInches	$4\frac{1}{2}$	5	6	7	8	9	10	12	14	15	
Bushingseach Faced Bushingseach	.75 2.10	.93 2.60	1.25 3.75	1.87	$\frac{2.75}{8.25}$	3.25 9.75	3.75	5.00	12.50	16.00	

Left Hand Bushings add 15 per cent. to list of Right Hand.

PLUGS





PLATE 71. PLUG

PLATE. 72 COUNTERSUNK

Size	.Inche	es 1	8 1	4 3	8 1 1	2 3	4 1	1	4 1	1/2 2	2 21/2	<u> </u>
Plugs Plugs, Countersunk Plugs, Solid. Plugs, Left Hand	eac	h		4 0	4 .0	4 .0	6 .0	8 .0	$\begin{array}{c c} 9 & .1 \\ 9 & .1 \end{array}$	1 .1	5 .30	.25 .40 .38
SizeInches						7		9	10	12	14	15
Plugseach Plugs, Solideach		.42 .63			1.20 1.80	1.85 2.80	$\frac{2.75}{4.15}$	3.25 5.00	3.75 5.75	5.00 7.50	12.50	15.00



CALVANIZED CAST IRON FITTINGS

SizeInches	1/4	3/8	1/2	3/4	1	11/4	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	3 ½	4
1711	.10 .	10	.12	.16	.21	.32	.40	.56	1.00	1.50	2.10	2.40
Elbows				.18	.24	.36	.46	.64	1.20	1.70	2.40	2.80
Elbows, Reducing		10		.18	.24	.36	.46	.64	1.20	1.70	2.40	2.80
Elbows, R & L		12	.14		.24	.38	.48	.68	1.20	1.80	2.50	2.90
Elbows, 45°	.12 .			.20			1.20		3.00	4.50	6.30	7.20
Elbows, Side Outlet			.36	.48	.60	.96		.82	1.46	2.20	3.00	3.50
Tees			.18	.24	.30	.46	.58		1.66	2.50	3.50	4.00
Tees, Reducing		18	.20	.28	.34	.54	.66	.94		6.50	9.00	10.50
Tees, Side Outlet			.54	.72	.90	1.40	1.80	2.50	4.50	0.50	9.00	10.00
Offsets:									0.00	0.00	10.00	12.00
To set off 4 inches				.90	1.40	2.00			6.00	8.00		18.00
To set off 6 inches				1.34	2.10	3.00	3.60		9.00	12.00	15.00	
To set off 8 inches				1.80	2.80	4.00	4.80		12.00	16.00		24.00
Crosses		30	.32	.44	.54	.84	1.06		2,60	4.00	5.40	6.30
Crosses, Reducing	1000		.36	.50	.60	.92	1.20	1.66		4.40	6.00	7.00
Reducers				300					1.20	1.60	2.00	2.70
Bushings			.08					.28	.42	.60	.80	1.00
Dlum	.04 .	04		.06					.36	.50	.76	.84
Plugs			.08	.12	,16			.30	.60	.80		
Plugs, Counter-sunk						05,000	-		.80	1.08		
Caps	* * * *			00	1.04	1 98	1.56		2.50	3.00	3.60	4.20
Flange Unions. St'd		100	.80	.92	1.04	1.20	1.00	2.00	2.00	0100		
Return Bends:			0.0	40	4.4	.56	.80	1.14	2.40	3.40	7.20	9.00
Close				.40	.44				2.70	4.40	8.00	10.50
Open				.52	.60	.80				6.00		
Back Outlet				.76	.84	1.20				6.90		
Side Outlet				.88	.96	1.38			4.60			
Y's			.40	.56	.68	1.08			3.35	5.00		9.20
Y's, Reducing			.46	.66	.80	1.24	1.52	2.16	3.80	5.80		
Lock Nuts									.54	.68	.94	1.28

SizeInches	4 1/2	5	6	7	8	9	10	12	14
Elbows	3.50	4.00	5.50	9.40	13.50	18.00	27.00	40.00	
Elbows, Reducing	4.00	4.60	6.30	10.80			31.00	46.00	126.00
Elbows, R. & L							94.00		110.00
Elbows, 45°	4.40		6.90	11.80			34.00		
Elbows, Side Outlet	10.50	12.00	16.50		10.70		39.00	58.00	150.00
Tees	5.10	6.00	8.00			$\frac{26.00}{30.00}$	45.00		166.00
Tees, Reducing	5.90	7.00	9.20	15.60		The state of the s			
Tees, Side Outlet	5.30	18.00	24.00						
Offsets		10.00	00.00						
To set off 4 inches		16.00				1000			
To set off 6 inches		24.00	$30.00 \\ 40.00$						
To set off 8 inches		32.00	14.50	24.50			70.00	105.00	
Crosses	9.20		16.00				77.00		
Crosses, Reducing	$\frac{10.20}{3.70}$	4.00	5.40	10.70		16.70	20.00		60.00
Reducers		1.85	2.50				7.50	10.00	25.00
Bushings	1.30	1.75	2.40				7.50	10.00	25.00
Plugs		1.10	100		-	4405000000			
Plugs, Counter-sunk	2.10	2.40	3.10					14.00	38.00
Flange Unions, St'd	5.40					20.00	23.00	32.00	
Return Bends:									
Close	14 00	21.50	27.00						
Open									
Back Outlet									
Side Outlet		2000							
Y's	111.80	14.00	18.40	31.20	45.00			134.00	
Y's, Reducing	13.60	16.00	21.20	36.00	02.00	10.00	100.00		
Lock Nuts	1.70	1.80	2.60	3.40) 4.70	5.40	6.00	8.00) 14.0



CAST IRON FITTINGS

ECCENTRIC REDUCING COUPLINGS



PLATE 73

SizeInches	. 1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Priceeach	.55	.55	.72	1.00	1.50	2.40	3.00	4.00
SizeInches	$4\frac{1}{2}$	5	6	7	8	9	10	12
Priceeach	5.00	6.00	8.00	9.00	11.00	12.50	14,00	18.00

ECCENTRIC BUSHINGS



PLATE 74

Size.Inches	$1\frac{1}{4} \times \frac{1}{2}$	$1\frac{1}{2} \times \frac{1}{2}$	$1\frac{1}{2} \times \frac{3}{4}$	$2 \times \frac{1}{2}$	$2 \times \frac{3}{4}$	2 x 1	$2 \times 1\frac{1}{4}$	$2\frac{1}{2} \times 1\frac{1}{2}$	3 x 2	4 x 3
Priceeach						000000				-

All Bushings, right and left, or left hand, double above prices.

CAST IRON RIGHT AND LEFT COUPLINGS



PLATE 75

SizeInches	1/4	3/8	1/2	3/4	1	1 1/4	1 ½	2	21/2	3	4
Price Each	.20	.20	.20	.25	. 35	.40	.55	.70	.85	1.20	2.00



CAST IRON FITTINGS

FLANGE UNIONS



PLATE 5310 STANDARD

STANDARD FLANGE UNIONS

FOR 125 POUNDS WORKING PRESSURE

SizeInches	1/2	34	1	11/4	1 1/2	2	21/2	3	3 1/2	4	$4\frac{1}{2}$
Priceea. Price, Galvea.		.46 .92	.52 1.04	.64 1.28	.78 1.56			1.50	3.60	2.10 4.20	2.70 5.40
SizeInches	5	6	7	8	9	10	12	14	15	16	
Priceea. Price, Galvea.	3.15 6.30	3.95 7.90	5.50 11.00	7.00 14.00	10.00 20.00	$11.50 \\ 23.00$	$\frac{16.00}{32.00}$	$\frac{28.00}{56.00}$	$\frac{35.00}{70.00}$	60.00 120.00	



PLATE 5311 EXTRA HEAVY

EXTRA HEAVY FLANGE UNIONS

FOR 250 POUNDS WORKING PRESSURE

SizeInches	1/2	3/4	1	11/4	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$
Price each	. 60	.70	.80	1.00	1.15	1.50	1.90	2.25	2.70
Size	4	4 1/2	5	6	7	8	9	10	12
Priceeach	3.15	4.00	4.75	6.00	8.25	10.50	15.00	17.25	24.00

LIST SIZES STANDARD CAST OF IRON **FITTINGS**

In arranging the order of Cast Iron Fittings we will use the following rule: For example, it is well known the largest opening, either in the run or branch, determines the size of the fitting. A $\frac{3}{4}$ x $\frac{9}{4}$ x $1\frac{1}{4}$ Tee will therefore be found amongst the $1\frac{1}{4}$ -inch fittings. Of course, these remarks apply to all sizes and combinations. In describing Fittings, the run is first named, then the outlet.

ELBOWS

		LLDOWS		
Size	Size	Size	Size	Size
14 x 14 38 x 38 15 x 15 15 x 38 34 x 36 34 x 16 34 x 16 34 x 38 1 x 1 1 x 34 1 x 34 1 x 34	134 x 134 134 x 1 134 x 3 134 x 34 134 x 36 135 x 136 136 x 136 136 x 134 136 x 13 136 x 13 1	2 x 1 ¼ 2 x 1 2 x 3 2 ½ x 2 ½ 2 ½ x 2 ½ 2 ½ x 1 ½ 3 x 3 ½ 3 x 2 ½ 3 x 2 3 ½ x 3 ½	4 x 4 4 x 3 ½ 4 x 3 4 x 2 ½ 4 x 2 4 ½ x 4 ½ 5 x 5 5 x 4 5 x 3	6 x 5 6 x 4 7 x 7 7 x 6 8 x 8 8 x 7 8 x 6 9 x 9 10 x 10 12 x 12
	- A 1 72	0 72 8 0	6 x 6	

45° ELBOWS

				-						
SizeInche	2 3/	1 1/	3/	1	1 11/	1 11/ 1	0	1 91/1	9	1 91/
		/2	74	1	1 74	1 /2	4	472	0	0 72
SizeInche	8 4	41/2	5	-6	7	8	O	10	19	W 10 10 10 10

PITCHED ELBOWS

Cina T. 1	2/		0.0	1 .					
SizeInches	24	1 X	34	1 1	1 4 x 1	1 14	1 1/2 x 1 1/4	11/2	$2 \times 1 \frac{1}{2}$
SizeInches SizeInches	2	$2\frac{1}{2}$ x	2	21/2	3×216	3	3 1/2 x 3	3 1/2	4

RIGHT AND LEFT ELBOWS

SizeInches	1/4	3/8	1/2	3/	1	11/4	11/6	2	21/2	3

TEES

In describing Tees, the run is first named, then the outlet, thus: $\frac{1}{4}$ **T** $\frac{3}{8} = \frac{1}{4} \times \frac{3}{8} \times \frac{3}{4}$

Size	Size	Size	Size
14 x 14 x 14 36 x 36 x 36 15 x 15 x 15 15 x 15 x 15 15 x 36 x 36 15 x 36 x 36 16 x 36 x 36 17 x 36 x 36 18	34 x 36 x 34 34 x 36 x 36 32 x 36 x 36 12 x 12 x 34 1 x 1 x 1 1 x 1 x 36 1 x 1 x 1 1 x 1 x 36 1 x 3	1 x ¼x1 ¾x ¾x1 ½x ½x1 ½x ½x1 1½x ½x1 1¼x1¼x1 1¼x1¼x1 1¼x1¼x1 1¼x1 x 1¼ 1¼x1 x 3¼ 1¼x1 x 1¼ 1¼x1 x 3¼ 1¼x1 x 1¼ 1¼x1 x 3¼ 1¼x1 x 1¼ 1¼x1 x 3¼ 1¼x1 x 3	11/4 x 1/2 x 1/4 11/4 x 1/2 x 1/4 11/4 x 1/2 x 1/4 1 x 3/4 x 1/4 2 x 3/4 x 1/4 2 x 3/4 x 1/4 11/2 x 1/2 x 1/4 11/2 x 1/2 x 1/4 11/2 x 1/4 x 1/4



LIST OF SIZES STANDARD CAST IRON FITTINGS

TEES-CONTINUED

Size	Size	Size	Size
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1 x 1 x 2 1 x 3 4 x 2 34 x 34 x 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	3 x 2 x 1 3 x 1 1/2 x 3 3 x 1 1/2 x 2 1/2 3 x 1 1/2 x 2 1/2 3 x 1 1/2 x 2 1/2 3 x 1 1/2 x 3 2 1/2 x 2 x 3 3 1/2 x 3 1/2 x 3 3 1/2 x 3 1/2 x 3 3 1/2 x 3 1/2 x 2 1/2 3 1/2 x 3 1/2 x 2 1/2 3 1/2 x 3 1/2 x 1 1/4 3 1/2 x 3 1/2 x 1 1/4 3 1/2 x 3 1/2 x 3 1/2 3 1/2 x 3	4 x 3 x 2 y 4 x 3 x 1 y 4 x 3 x 1 y 4 x 3 x 1 y 4 x 3 x 1 y 4 x 3 x 1 y 4 x 2 y 5 x 3 y 4 x 2 y 5 x 1 y 4 x 2 y 5 x 1 y 4 x 2 y 5 x 1 y 4 x 2 y 5 x 1 y 4 x 2 y 5 x 1 y 4 x 2 y 5 x 1 y 4 x 2 y 5 x 1 y 4 x 2 y 5 x 1 y 4 x 2 y 5 x 1 y 4 x 2 y 5 x 1 y 4 x 2 y 5 x 1 y 4 x 2 y 5 x 1 y 4 x 2 y 5 x 1 y 4 x 2 y 5 x 1 y 4 x 2 y 5 x 1 y 4 x 1 y 5 x 4
2 x2 x2 2 x2 x1 2 x2 x1 2 x2 x2 2 x2 x2 2 x2 x2 2 x1 2 x2 x2 2 x1 2 x2 2 x1 2 x1 2 x2 2 x1 2 x1 2 x2 2 x1 2 x1 2 x2 2 x	2½ x 2½ x 2½ 2 x 2 x 2½ x 2½ 2 x 1½ x 2½ 1½ x 1½ x 2½ 3 x 3 x 2½ 3 x 3 x 2½ 3 x 3 x 1½ 3 x 2½ x 3 3 x 2½ x 2½ 3 x 2½ x 2½ 3 x 2½ x 1½ 3 x 2½ x 1¼ 3 x 2½ x 1¼	3 ½ x 2 x 3 ½ 3 ½ 3 ½ x 1 ½ x 3 ½ 3 ½ x 1 ½ x 3 ½ 3 ½ x 1 ½ x 3 ½ 3 ½ x 1 ½ x 3 ½ 3 ½ x 1 ½ x 4 x 4 x 4 x 2 ½ 4 x 4 x 1 ¼ 4 x 4 x 1 ¼ 4 x 4 x 1 ¼ 4 x 4 x 1 ¼ 4 x 4 x 1 ¼ 4 x 4 x 3 ½ x 3 ½ x 3 ½ x 3 ½ x 3 ½ x 3 ½ x 3 ½ x 3 ½ x 3 ½ x 3 ½ x 3 ½ x 3 ½ x 3 ½ x 3 ½ x 1 ½ 4 x 3 ½ x 3 ½ x 1 ½ 4 x 3 ½ x 1 ½ 4 x 3 ½ x 1 ½ 4 x 3 ½ x 1 ½ 4 x 3 ½ x 1 ½ 4 x 3 ½ x 1 ½ 4 x 3 ½ x 1 ½ 4 x 3 ½ x 1 ½ 4 x 3 ½ x 1 ½ 4 x 3 ½ x 1 ½ 4 x 3 ½ x 3 ½ x 1 ½ 4 x 3 ½ x 3 ½ x 1 ½ 4 x 3 ½ x 3 ½ x 1 ½ 4 x 3 ½ x 3 ½ x 1 ½ 4 x 3 ½ x 3 ½ x 1 ½ 4 x 3 ½ x 3 ½ x 1 ½ 4 x 3 ½ x 3 ½ x 1 ½ 4 x 3 x 3 x 3 ½ x 1 ½ 4 x 3 x 3 x 3 ½ x 1 ½ 4 x 3 x 3 ½ x 1 ½ 4 x 3 x 3 x 3 ½ x 1 ½ 4 x 3 x 3 x 3 x 3 x 3 x 3 x 3 x 3 x 3 x	4 ½ x 4 ½ x 2 4 ½ x 4 ½ x 1 ¼ 5 x 5 x 5 5 x 5 x 4 ½ 5 x 5 x 3 ½ 5 x 5 x 2 ½ 5 x 5 x 4 x 2 ½ 5 x 4 x 4 x 2 ½ 5 x 4 x 4 x 2 ½ 5 x 4 x 4 x 2 ½ 5 x 3 x 4 x 2 ½ 5 x 3 x 4 x 3 ½ 5 x 4 x 4 x 3 ½ 5 x 4 x 3 ½ 5 x 3 x 3 x 4 ½ 5 x 3 x 3 x 4 ½ 5 x 3 x 3 x 3 ½ 5 x 3 x 3 x 3 ½



LIST OF SIZES STANDARD CAST IRON FITTINGS

TEES-CONTINUED

Size	Size	Size	Size
5 x 3 x 3 5 x 3 x 2 5 x 3 x 2 5 x 2 ½ x 5 5 x 2 ½ x 5 5 x 2 ½ x 5 5 x 2 ½ x 3 5 x 2 x 5 6 x 6 x 6 6 x 6 x 4 6 x 6 x 3 6 x 6 x 2 6 x 6 x 2 6 x 6 x 2 6 x 6 x 2 6 x 6 x 3 6 x 6 x 3 6 x 6 x 2 6 x 6 x 3 6 x 6 x 5 6 x 6 x 6 6 x 6 x 5 6 x 6 x 6 6 x 6 x 5 6 x 6 x 6 6 x 7 6 x 7	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	6 x 6 x 7 8 x 8 x 8 8 x 8 x 7 8 x 8 x 6 8 x 8 x 4 8 x 8 x 3 8 x 8 x 2 8 x 8 x 2 8 x 7 x 8 8 x 7 x 6 8 x 6 x 8 8 x 6 x 6 8 x 5 x 5 8 x 5 x 5 8 x 4 x 8 6 x 6 x 8	9 x 9 x 9 9 x 9 x 7 9 x 9 x 6 9 x 9 x 5 10 x 10 x 10 10 x 10 x 6 10 x 10 x 6 10 x 10 x 5 10 x 10 x 4 10 x 10 x 3 10 x 8 x 8 10 x 12 x 12 12 x 12 x 10 12 x 12 x 12 12 x 12 x 8 12 x 12 x 5 12 x 12 x 4 12 x 8 x 10 12 x 8 x 8

CROSSES

The outlets of a Cross are always the same size, and both denoted by the last figure

Size	Size	Size	Size
1/2 x 1/2 x 1/2 3/4 x 3/4 x 2/3/ 3/4 x 3/4 x 1/2 1 x 1 x 1 1 x 1 x 3/4 1 x 1 x 1/4 1 1/4 x 1/4 x 1 2 x 2 x 2 2 x 2 x 1/4	2 x2 x1 1/4 2 x2 x 3/4 2 x2 x 3/4 2 1/2 x 2 1/2 x 1 1/4 2 1/2 x 2 1/2 x 1 1/4 2 1/2 x 2 1/2 x 3/4 2 1/2 x 2 1/2 x 3/4 2 1/2 x 2 1/2 x 3/4 2 1/2 x 2 1/2 x 3/4 3 x 3 x 3 x 2 1/2 3 x 3 x 3 x 1 1/4 3 x 3 x 3 x 3/4 3 1/2 x 3/4 x 3/4 x 3/4 3 1/2 x 3/4 x 3/4 x 3/4 3 1/2 x 3/4 x	3½ x 3½ x 2 3½ x 35% x 1 ½ 4	6 x 6 x 3 6 x 6 x 2 2/2 6 x 6 x 2 7 x 7 x 7 7 x 7 x 6 7 x 7 x 5 8 x 8 x 8 8 x 8 x 7 8 x 8 x 8 8 x 8 x 5 8 x 8 x 4 9 x 9 x 9 10 x 10 x 10 10 x 10 x 10 10 x 10 x 7

REDUCERS

Size

Size



SIZES LIST CAST IRON STANDARD OF **FITTINGS**

ECCENTRIC REDUCERS

Size

Size

BENDS

Size	olize)	Size	BIZE					
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	x 6 3 3 4 x 8 x 8 x 6 3 1	4 x 34 2 x 1 14 2 x 1 14 2 x 1 14 2 x 1 12 2 x 2 12	4 x 21 4 x 31 5 x 21 5 x 21 5 x 3 5 x 31 6 x 21 6 x 3 6 x 3 6 x 5 8 x 5	/2 Si /2 Si /2 Si /2 Si	ze P ze		4 to 15	2 inc
	,	BUS	HINGS					
Size	Size	5	Size	Siz	e		Size	
4 x 1/8 3/8 x 1/4 3/8 x 1/4 3/2 x 3/4 3/4 x 1/2 1 x 3/4 1 x 3/4 1 x 3/4 1 1/4 x 1/4	11/2 x 3/8 11/2 x 1/2 11/2 x 1/4 11/2 x 1/4 2 x 3/8 2 x 3/8 2 x 3/8 2 x 1/2 2 x 1/2 2 x 1/2 2 x 1/2 2 x 1/2 2 x 1/2 2 x 1/2 3 x 1/4 2 1/2 x 1 1/2 2 1/2 x 1 1/2 3 x 1/4 2 1/2 x 1 1/2 3 x 1/4 2 1/2 x 1 1/2 3 x 1/4 2 1/2 x 1 1/2 3 x 1/4 3 x 1/4 3 x 1/4 3 x 1/4 3 x 1/4	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	x 2 x 2 y 2 x 1 x 1 x 1 y 2 x 2 y 2 x 3 x 1 x 1 y 2 x 2 y 2 x 3 x 1 y 2 y 2 y 2 x 3 x 3 y 2 y 2 y 2 x 3 x 3 y 2 y 2 y 2 x 3 x 2 y 2 y 2 x 3 x 3 y 2 y 2 y 2 y 2 y 2 y 2 y 2 y 2 y 2 y 2	5 x 5 x 5 x 5 x 5 x 5 x 5 x 5 x 5 x 5 x	3 3 ½ 4 4 ½	10 10 10 10 10 10	8 x 2 2 8 x 2 2 8 x 2 2 2 x 10	1/2
N. Charles			LOSE AND			1	2 1/2	3
Sizes	OFFSETS-T	34 O OFFS		14 11 AND 8 1		2 2	/2	3
Sizes 34	1 11/4 1	1/2 2	21/2	3 3 1/2	4	4 1/2	5	6



EXTRA HEAVY CAST IRON FITTINGS

FOR 250 POUNDS WORKING PRESSURE



PLATE 83 ELBOW



PLATE 84



PLATE 85 CROSS

SizeInches	1/2	34	1	11/4	1 1/2	2	2 1/2	3	3 1/2
Price, Elbowsea.	.25	.30	.35	.45	.60	.75	1.25	2.00	2.75
Price, Elbows, Reducing ea.	.35	.40	.45	.55	.75	.95	1.55	2.50	3.40
Price, Elbows, 45°ea.	.35	.40	.45	.55	.70	.90	1.50	2.50	3.50
Price, Teesea.	.40	.50	.55	.70	.90	1.15	1.80	3.00	4.25
Price, Tees, Reducing ea.	.55	.65	.70	.90	1.15	1.40	2.25	3.75	5.30
Prices, Crossesea.	.60	.65	.70	.90	1.20	1.50	2.50	4.00	5.50
Price, Crosses, Reducingea.	.80	.85	.90	1.15	1.50	1.85	3.15	5.00	6.85
Price, Y'sea.			1.10	1.35	1.80	2.25	3.75	6.00	8.25
Price, Y's Reducingea.			1.38	1.75	2.25	2.88	4.50	7.50	10.63
Sizesnches	4	4 1/2	5	6	7	8	9	10	12
Price, Elbowsea.	3.50	4.25	5.50	8.00	12.00	17.00	25.00	28.00	40.00
Price, Elbows, Reducingea.	4.40	5.30	6.80	10.00		21.00		35.00	50.00
Price, Elbows, 45°ea.	4.50	5.50	6.75	9.75			31.00	34.00	48.00
Price, Teesea.	5.50	6.75	8.25	12.00				42.00	60.00
Price, Tees, Reducing, ea	6.85	8.50	10.25	15.00				52.00	75.00
Price, Crossesea.	7.00	8.50	11.00	16.00				56.00	80.00
rice, Crosses Reducing ea.		10.00			30.00			70.00	100.00
Price, Y'sea.	11.00	13.50	16.50	24 00	36.00	50.00	72.00	84.00	120.00
Price, Y's Reducingea.	10 77	10 00	00 00	00 00	4 . 00	00 40	90.00	105.00	

Galvanized Extra Heavy Fittings, double above list.

The following Extra Heavy Reducing Tees are standard. Other sizes will be made to order by bushing in the sand, at a special price according to quantity wanted.

1	X	1.	v	34	1	0			**	2				1	1/2	1	-	,		0		0	1	,	,	4		-				1 /	7	-	-	-	-	-	-	_	-	_	=	-		-	-
			~	/4		4																		2		4	X	4	- 2	ζ.	1	1/2	- 1	6	X	6	X	: 4	ė.		- 1		8	v	- 3	8 -	X 4
	X	1	X	1/0		2			x	2			v	1	1/4		- 52	2 .	0	2	v	9		770	1	1	40	1	4		1	14															
				14	- 1	-																			1	4	A	4	: 2	٤.	1	/4	- 1	6	X	O	-x	. 3									1715
					.	2			X	2			X	1		- 1	3	3	7	3	X	1	1	6	1									6	v	G	37	. 0	1	1		1					
L	1	11/4	1 30	1		0				0																														2	- 1						
						2			Х	2			X		3/4	-	- 3	2		3	X	1	1/	1		5	X	-5	2	2 4	4		-1	6	x	6	X	9	,			11	1	v	16	1 ,	x (
1/	Y	11/4	v	3/												- 1										~	85	-			-		- 1	-		9		_			- 1						
/ "	44	1/9	100	14												.										Э	Х	O	N		3		-							2 2	. 1	1	0 :	X	16) 7	x 2
																										5	v	5	-	. 6)	1/5	-	7	**	7	**	-			1			-	- '		
1.	-	1 1		11/	1	0		1		à		٠.		-			٠.				٠.											72	- 1	6	λ	6	X	O	2		4						
7	X	1 1/	2 X	11/4	- 1	2	1	2	X	2	1/	6 3	X	2		1	4	- 3	2 0	4	v.	3			1	5	v	5	X	. 6)		-1								- 1	1:	0 .		16	1	
I		11/	S 800 3	1	- 1												-		•	7	**	0	*										- 1									1,	4.	X	14	22	X.
					- 1	4	1	2	X	2	1	2 3	X	1	1/2	П	4	2	()	1	X	2	1/0)										8	V	8	v	6	e .			1 5) .		16) ~	×
1/	v	11/2	w	3/		0	1.		-	0	1	7.		1	17									4																							
1		1/2	1 1	74	- 1	4	/	2	A	4	1	2	X	1	14	4	4	- >	6 4	ŧ	X	2				ti.	X	ti	X		3		- 1	8	X	8	X	5			1	1:) .	v	15) ~	- 1

Elbows, 45° Elbows, Y's and Crosses are not carried in stock in Reducing sizes, but will be made to order by bushing in the sand from the straight patterns, at a special price according to quantity wanted.



CAST IRON LONG TURN FITTINGS

FOR 125 POUNDS WORKING PRESSURE SCREWED



PLATE 136 NO. 1. WATER ELBOW



PLATE 137
NO. 2 DOUBLE BRANCH WATER ELBOW

WATER ELBOWS-SCREWED

SîzeInches	1	1 1/4	1 ½	2	$2\frac{1}{2}$	3	3 1/2	4
No. 1 Each	.32	.40	. 55	.80	1.20	2.25	3.25	3.50
No. 2 Each	. 64	.80	1.10	1.60	2.40	4.50	6.50	7.00
SizeInches	4 1/2	5	6	7	8	9	10	12
No. 1 Each	5.50	6.50	8.75	13.00	17.00	25.50	30.00	40.00
No. 2 Each	11.00	13.00	17.50	26.00	34.00	51.00	60.00	80.00



PLATE 138
NO. 3. WATER TEE, SINGLE SWEEP



PLATE 139 NO. 4. WATER CROSS

WATER TEE AND CROSS-SCREWED

SizeInches	1	11/4	$1\frac{1}{2}$	2	21/2	3	3 1/2	4
No. 3 Each	.48	.60	.82	1.20	1.80	3.40	4.90	5.25
No. 4 Each	.85	1.10	1.50	2.15	3.20	6.00	8.75	9.50
SizeInches	4 ½	5	6	7	8	9	10	12
No. 3 Each No. 4 Each		9.75 17.50	$\frac{13.25}{24.00}$	19.50 35.00	25.50 45.00	38.00 68.00	45.00 80.00	60.00 107.00

Galvanized Fittings Double Black List

CAST IRON LONG TURN FITTINGS

FOR 125 POUNDS WORKING PRESSURE



PLATE 142
REDUCING DOUBLE BRANCH ELBOW

REDUCING DOUBLE BRANCH ELBOWS

SizeInches	$\frac{34}{4} \times 1$	1 x 1 1/4	$1\frac{1}{4} \times 1\frac{1}{2}$	$1\frac{1}{2} \times 2$	$2 \times 2 \frac{1}{2}$	$2\frac{1}{2} \times 3$	3 x 4	$3\frac{1}{2} \times 5$	4 x 5	5 x 6
Priceeach	.65	.75	1.05	1.50	2.25	4.25	6.50	10.00	12.00	16.50



PLATE 143 BASE ELBOW



PLATE 144 BASE TEE

LONG TURN BASE FITTINGS

SizeInches	3	, 4	$4\frac{1}{2}$	5	6	7	8	9	10	12
Elboweach Teeeach	8.00 12.00	$\frac{11.00}{16.50}$	$\frac{14.00}{21.00}$	$15.00 \\ 22.50$	18.00 27.00	25.00 38.00	32.00 50.00	40.00 65.00	50.00 85.00	65.00 105.00

We can furnish Base Fittings in all sizes, both screwed and flanged. They will be found very convenient where it is necessary to support a long vertical line of pipe on a pier of masonry or other foundation.

These Fittings are made in reducing sizes by filling up ends, thus avoiding the use of screwed bushings. For price add 50 per cent, to above list.

Galvanized Fittings Double Black List

LONG TURN FITTINGS RON CAST

FOR 125 POUNDS WORKING PRESSURE



SCREWED



PLATE 140 NO. 5. WATER TEE, DOUBLE SWEEP

PLATE 141 NO. 6. SWEEP CROSS

SWE	EP T	EE A	ND C	ROSS	SCRE	WED		
SizeInches	1	1 1/4	1 ½	2	2 ½	3	3½	4
No. 5 Each		.80	1.10	1.60 2.15	2.40	4.50 6.00	6.50 8.75	7.00 9.50
SizeInches	4 ½	5	6	7	8	9	10	12
No. 5 Each No. 6 Each	11.00 15.00	13.00 17.50	17.50 24.00	26.00 35.00			60.00 80.00	80.00

These fittings are made in reducing sizes by filling up ends, thus avoiding the use of screwed bushings.

For Reducing Sizes add 50 per cent. to the above list. For Extra heavy Fittings, Special Prices.

Galvanized Fittings Double Black List

LIST OF REDUCING SIZES TURN STANDARD CAST IRON LONG FITTINGS

No. 1, 2, 3 and 4 Reducing Fittings will be made to order by Bushing in the sand.

WATER TEES AND NO. 6 CROSSES NO. 5 *4 x 4 x 6 4 x 3 1/2 x 5 *2½ x 2½ x 1½ 3 1/2 x 3 x 4 *8 x 8 x 6 *6 x 6 x4x 1 1/2 x 2 1/2 *5 x5x3 x3 *3 *4 x 4 x 5 x 6 4×5 *4 x 4

Note.—No. 6 Reducing Crosses, carried in stock, are listed in sizes indicated by an*.

Other sizes made to order by bushing in the sand.

Reducing Flanged, or Screwed and Flanged Fittings can be furnished with Flanged Ends on one or more openings.

They can be furnished Reducing on the screwed end, by bushing in the sand at same

price.

They can be furnished Reducing on the flanged ends, at special prices.



CAST IRON MANIFOLDS, OR BRANCH TEES



PLATE 86



PLATE 87 SIDE OUTLET



PLATE 88 BACK OUTLET

All openings in Manifolds are tapped right hand unless otherwise specified.

	1 in.	Manif	olds	1 1/4.	n .Mar	nifolds	1 ½in	. Mani	folds	2 in	. Mani	folds
	2 ½ in.	. Ctr. 1	to Ctr.	3 in.	Ctr. t	o Ctr.	3½ in.	Ctr. t	o Ctr.	4 ½ in	n. Ctr. t	o Ctr.
No. of Brancnes	1 or 11/4 in. Run	1½ in. Run	2 in. Run	1½ or 1½ in. Run	2 in. Run	2½ in. Run	1½ or 2 in. Run	2½ in. Run	3 in. Run	2 in. Run	2½ or 3 in. Run	3½ in. Run
1	.90 1.05 1.15 1.35 1.60 1.90 2.20 2.65	1.00 1.15 1.30 1.45 1.75 2.20 2.45 2.90 3.30 4.50	1.15 1.35 1.60 1.85 2.10 2.45 2.75 3.40 4.00 4.80	1.65 2.00 2.40 2.80 3.20 3.60 4.30 4.80 5.00	1.90 2.40 2.90 3.30 3.90 4.50 5.25 5.85 6.25	2.40 2.85 3.55 3.95 4.20 4.95 6.15 6.85 7.25	2.70 3.35 4.00 4.65 5.25 5.85 6.50 7.60 8.00	3.45 4.15 5.00 5.75 6.50 7.00 8.25 9.25 9.75	3.80 4.60 5.50 6.25 7.25 7.75 9.00 10.00 10.75	5 25 6.40 7.65 8.80 10.60 11.50 12.25 13.50	5.75 7.00 8.50 9.75 11.75 12.75 13.50 15.00	6.25 7.75 9.25 10.75 13.00 14.00 15.00 16.50
3 4		4.75 5.50 7.00 7.50 8.00	5.10 6.00 7.25 7.75 8.25	5.25 6.00 6.75 7.50	6.50 7.00 7.75 8.50	7.65 8.25 9.00 9.75	8.50	10.50	11.50		16.50	

2 inch Body Manifolds are all 21/2 inches inside diameter.

2½ inch Manifolds are all 3 inches inside diameter.

3 inch Manifolds are all $3\frac{1}{2}$ inches inside diameter.

Always order Manifolds by size and number.

Manifolds can be furnished with side or back outlet at end when ordered this way sketch must accompany order.



WORKING PRESSURES UP TO 125 POUNDS



PLATE 156 ELBOW



PLATE 157 45° ELBOW

				11	1		200
	Faced	Faced and Drilled	Centre To Face	Diameter Of Flange	Faced Only	Faced and Drilled	Centre To Face
Size			4 1/2	6	3.30	3.90	2 1/2
2	3.00	3.60	7.50	7	3,50	4.10	3
2 1/2	3.15	3.75	5		3,80	4.50	3
3	3.45	4.15	$5\frac{1}{2}$	7 1/2		5.35	3 1/2
3 1/2	4.05	4.90	6	8 1/2	4.50		4
	4.50	5.50	$6\frac{1}{2}$	9	5.00	6.00	1
4		6.50	7	91/4	6.00	7.00	4
4 1/2	5.50			10	6.90	7.90	4 1/2
5	6.25	7.25	7 ½		8.35	9.65	5
6	7.60	8.90	8	11	100.0000	12.50	5 1/2
7	10.50	12.00	8 1/2	$12\frac{1}{2}$	11.00		5 1/2
8	12.00	13.60	9	13 ½	12.60	14.20	
	1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		10	15	17.75	20.00	6
9	17.00		11	16	20.00	22.70	6 1/2
10	19.00			19	29.50	32.50	7 1/2
12	28.00	31.00	12		41.50	45.25	7 1/2
14	41.50	45.25	14	21		51.50	8
15	47.00	51.50	$14\frac{1}{2}$	22 1/4	47.00	WW #0	
47,00	54.50		15	$23\frac{1}{2}$	54.50	59.50	8
16				25	71.00	77.00	81/2
18	71.00			27 1/2	90.00	97.00	9 1/2
20	90.00	97.00		14	140.00		11
24	140.00	0 150.00) 22	32	140.00		

All fittings furnished FACED ONLY unless otherwise specified.

We can furnish the above fittings in semi-steel or east steel. Prices on application



WORKING PRESSURES UP TO 125 POUNDS



PLATE 164 REDUCING ELBOW

=						IG ELBOW				
	Size Inches	Price Face		Face	of Flanges	Size Inches	Price Faced	Price Faced and Drilled	l trete	of Flanges
3	x 1 !	£ 0.90	7.60	51/2	7½ x 5	8 x 4	24.00	25.00	9	13½ x 9
3	x 2	6.90	7.60	$5\frac{1}{2}$	$7\frac{1}{2} \times 6$	8 x 5	24.00	25.60	9	13½ x 10
3	x 2 !	1	7.60	$5\frac{1}{2}$	$7\frac{1}{2} \times 7$	8 x 6	24.00	25,60	9	13½ x 11
	2 x 2 1		8.95	6	8½ x 7	9 x 8	34.00	36.25	10	15 x 13 ½
	2 x 3	8.10	8.95	6	$8\frac{1}{2}$ x $7\frac{1}{2}$	10 x 5	38.00	40.70	11	16 x 10
1	x 2	9.00	10.00	$6\frac{1}{2}$	9 x 6	10 x 6	38.00	40.70	11	16 x 11
1	x 2 ½		10.00	$6\frac{1}{2}$	9 x 7	10 x 8	38.00	40.70	11	16 x 13 ½
1	x 3	9.00	10.00	$6\frac{1}{2}$	9 x $7\frac{1}{2}$	10 x 9	38.00	40.70	11	16 x 15
)	x 2 ½	1 100	13.50	2.70	10 x 7	12 x 6	56.00	59.00	12	19 x 11
	x 3	12.50	13.50	-	$10 \times 7\frac{1}{2}$	12 x 7	56.00	59.00	12	19 x 12½
	x 4	12.50	13.50	-	10 x 9	12 x 8	56.00	59.00	12	19 x 13 ½
	x 2 ½		16.55		11 x 7	12×10	56 .00	59.00	12	19 x 16
	x 3	15.25	16.55		11 x 7½	14 x 10	70.00	73.75	14	21 x 16
	x 3 ½	15.25	16.55	1	11 x 8½	14×12	70.00	73.75	14	21 x 19
	x 4	15.25	16.55		11 x 9	$15 \ge 10$	80.00	84.50	14 1/2	$22\frac{1}{4} \times 16$
	x 5	15.25			11 x 10	15 x 12	80.00	710		22¼ x 19
	x 5	market makes a	4		$2\frac{1}{2} \times 10$	16 x 12	90.00	95.00	15 2	$23\frac{1}{2} \times 19$
	x 6				- 1	16 x 14	90.00	95.00	15 2	$3\frac{1}{2} \times 21$
	x 3 ½	24,00	25.60	9 1	3½x 8½	16×15	90.00	95,00	15 2	3½ x 22¼

Flanged Fittings will always be furnished faced only, unless otherwise ordered. Flanged Taper Reducing Elbows not listed above will be made to order at special prices.



WORKING PRESSURES UP TO 125 POUNDS



PLATE 165 BASE ELBOW, FLANGED

Size	Price Faced Each	Price Faced and Drilled Each	Center To Face Inches	Center to Face of Base Inches	Diameter Flanges Inches	Size Base Inches
4	9.00	10.00	$6\frac{1}{2}$	6 1/2	9	6
4 1/2	11.00	12.00	7	634	9 1/4	6
5	12.50	13.50	7 1/2	7	10	7
6	15.25	16.55	8	7 1/2	11	7
7	21.00	22.50	8 1/2	81/4	$12\frac{1}{2}$	7
8	24.00	25.60	9	834	$13\frac{1}{2}$	9
9	34.00	36.25	10	$9\frac{1}{2}$	15	9
10	38.00	40.70	11	10	16	9
12	56.00	59 00	12	$10\frac{1}{2}$	19	11
14	70.00	73.75	14	$13\frac{1}{2}$	21	11
15	80.00	84.50	$14\frac{1}{2}$	14	$22\frac{1}{4}$	11
16	90.00	95.00	15	14 3/4	$23\frac{1}{2}$	11

Flanged fittings will always be furnished faced only, unless otherwise ordered.



WORKING PRESSURES UP TO 125 POUNDS.



PLATE 166 LONG RADIUS FLANGED ELBOW.

20

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PLATE 167 REDUCER

			LD LLDO		REDUCER				
Size	Faced Only	Faced and Drilled	Centre to Face	Dia. of Flanges	Standard Sizes Face to Face				
2	5.00	5.90	$6\frac{1}{2}$	6	$\begin{array}{cccccccccccccccccccccccccccccccccccc$				
$2\frac{1}{2}$	5.25	6.15	7	7	3 x 2½ and less 6				
3	5.75	6.85	734	7 1/2	3½ x 3 and less 4 x 3½ and less 7				
$3\frac{1}{2}$	6.75	8.00	81/2	8 1/2	$4\frac{1}{2} \times 4$ and less $7\frac{1}{2}$ 5 x $4\frac{1}{2}$ and less 8 6 x 5 and less 9				
4	7.50	9.00	9	9	6 x 5 and less 9 7 x 6 and less 10				
$4\frac{1}{2}$	9.25	10.75	9 ½	91/4	8 x 4 and over 11 8 x 3 ½ and less 11				
5	10.50	12.00	10 1/4	10	9 x 4 and over 11½ 9 x 3½ and less 11½				
6	12.65	14.60	111/2	11	$\begin{array}{cccccccccccccccccccccccccccccccccccc$				
7	17.50	19.75	1234	121/2	12 x 6 and over 14 12 x 5 and less 14				
8	20.00	22.40	14	13 ½	14 x 8 and over 16 16 14 x 7 and less 16				
9	28.50	31.85	151/4	15	15 x 10 and over 15 x 9 and less 17				
0	31.50	35.50	161/2	16	16 x 10 and over 18 16 x 9 and less 18				
2	46.50	51.00	19	19	18 x 10 and over 19 18 x 9 and less 19				
4	69.00	74.50	211/2	21	20 x 12 and over 20 x 10 and less 20				
5	78.00	84.75	2234	221/4	24 x 12 and over 24 x 10 and less 24				
6	91.00	98.50	24	23 1/2					
8			26 ½	25	Reducers with lengths differing from				

above both in regular and eccentric pattern can be furnished.

2716 Prices on Reducers on application.

All fittings furnished FACED ONLY unless otherwise specified. We can furnish the above fittings in semi-steel or cast steel. Prices on application.

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WORKING PRESSURES UP TO 125 POUNDS



PLATE 158 TEE



PLATE 159 REDUCING TEE

				۱۵	Dia.	1	Faced	Centre	Centre	Size
Size	Faced Only	Faced and Drilled	Cent'e to Face of Run	to Face of Outlet	of Flgs.	Faced Only	and Drilled	to Face of Run	to Face of Outlet	of Our let
2	4.35	5.25	$4\frac{1}{2}$	4 1/2	6	5.00	5.90	H S S 4 1/2	's 4½	
21/2	4.55	5.45	5	5	7	5.25	6.15	n. ittii	nall ca	
3	5.00	6.10	5 1/2	$5\frac{1}{2}$	7 ½	5.75	6.85	in run. dimens ight fitt	0 +	
3 1/2	5.85	7.10	6	6	81/2	6.75	8.00	on in see d	lumn outlet. 9 9 1/2	
4	6.50	8.00	6 1/2	$6\frac{1}{2}$	9	7.50	9.00	reduction ller, these ons of stra 2	column of outles	
4 1/2	8.00	9.50	7	7	91/4	9.25	10.75	ller ons	1.5	
5	9.10	10.60	7 1/2	7 1/2	10	10.50	12.00	sus ensi- ensi-	in last outlet. to face	
6	11.00	12.95	8	8	11	12.65	14.60	ged dim	s to 1	
7	15.25	17.50	81/2	81/2	12 ½	17.50	19.75	changed lumn or ases dim	given in ce of our centre to	
8	17.40	19.80	9	9	13 1/2	20.00	22.40	not est col	re to face given govern centre	
9	24.65	28.00	10	10	15	28,50	31.85	are r l oth 10	of of to	
10	27.50	31.50	11	11	16	31.50	35.50	All All	tings have outlet of ons govern centre to straight fittings gov	6
12	40.50	45.00	12	12	19	46.50	51.00	dimensions size given i e of run. Al ce of run.	uting of	8
14	60.00	65.50	14	14	21	69.00	74.50	of r	bt fi	9
15	68.00	74.75	14 1/2	14 1/2	22 1/4	78.00	84.75	face d let of s to face to face 111	2 Sa Sa 13 1	2 9
16	79.00	86.50	15	15	23 ½	91.00	98.50	has outlet of centre to face centre to face centre to face face face face face face face face	When fittings have dimensions govern asions of straight fit 12 12 12 12 12 12 12 12 12 12 12 12 12	10
18	103.00	112.00	161/2	16 1/2	25	118.00	127.00	s ou sntre entre	us us o 151	g 12
20	130.00	140.00	18	18	$27\frac{1}{2}$	150.00	160.00	Centre g has o m centre rn cent	nsio 17	14
24	203.00	218.00	22	22	32	233.00	248,00	d 60 60	When fitters dimensions of the second dimensions	16

All fittings furnished FACED ONLY unless otherwise specified.

We can furnish the above fittings in semi-steel or cast steel. Prices on application.



WORKING PRESSURES UP TO 125 POUNDS.



PLATE 160 CROSS.



PLATE 161 CROSS, REDUCING.

Size	Faced Only	Faced and Drilled	Cent'e to Face of Run	Cent'e to Face of Outlet	Dia. of Flgs	Faced Only	Faced and Drilled	Centre to Face of Run	Centre to Face of Outlet	Size of Out- let
2	6.75	7.95	$4\frac{1}{2}$	4 ½	6	7.75	8.95	1 g 4 1/2	5 S 4 1/2	
$2\frac{1}{2}$	6.95	8.15	5	5	7	8.00	9.20	run. nensio straig	smaller, er cases 2	
3	7.65	9.05	$5\frac{1}{2}$	$5\frac{1}{2}$	$7\frac{1}{2}$	8.75	10.15	t dimensions of straight 5 5 1/2		
$3\frac{1}{2}$	9.00	10.70	6	6	81/2	10.35	12.05	ns in sin o se d	all oth outlet.	
4	10.00	12.00	$6\frac{1}{2}$	61/2	9	11.50	13.50	reductions fler, these imensions 7 6 7 7	umnlos of 6 1/2	
$4\frac{1}{2}$	12.00	14.00	7	7	91/4	13.75	15.75	Iller, imer	5H 0 7	
5	13.75	15.75	$7\frac{1}{2}$	$7\frac{1}{2}$	10	15.75	17.75	r fg 7½	outlet.	
6	16.75	19.25	8	8	11	19.25	21.75	ged case	given in see of out sentre to	
7	23.00	26.00	81/2	8 1/2	12 1/2	26.50	29.50	num her her 8½	ze given face of n centro	
8	26.50	29.75	9	9	13 ½	30.50	33.75	ot c col l ot l	e n ge	
9	37.50	42.00	10	10	15	43.00	47.50	ne no last n all rum.	of so to so	
0	42.00	47.50	11	11	16	48.00	53.50	run. In face of 6	utlet of si centre to ings gover ings gover 6 01	6
2	61.50	67.50	12	12	19	71.00	77.00	nsio give f ru fac	out emine 11	8
4	91.00	98.50	14	14	21	105.00	112.50	imen ize g e of to to	ave ht fi	9
5	103.00	112,00	$14\frac{1}{2}$	$14\frac{1}{2}$	$22\frac{1}{4}$	118.00	127.00	ace din et of size to face centre	q of 5 13 ½	9
.6	120.00	130.00	15	15	$23{}^{1\!\!}/_{\!2}$	138.00	148.00	of a the total section of the	fittings have outlet of straight fittings govern centre of straight fittings grant 17 17 17 17 17 17 17 17 17 17 17 17 17	10
8	157.00	169.00	$16\frac{1}{2}$	$16\frac{1}{2}$	25	180.00	192.00	Centre to face dimensions are not changed by the Ansa outlet of size given in last column or sm m centre to face of run. In all other cases of the cases of run. The column of	then fitting dimensions sions of string sions of string 12 12 12 12 12 12 12 12 12 12 12 12 12	12
0	198,00	212,00	18	18	27%	228.00	242.00	Sept as 14	When with the street of the st	14
24	310.00	330,00	22	22	32	355.00	375.00	Centre to face dimensions are not changed by reductions fitting has outlet of size given in last colum or smaller, these govern centre to face of run. In all other cases dimensions fittings govern centre to face of run. 7	When fitt when the set dimensions of 12 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2	16

All fittings furnished FACED ONLY unless otherwise specified. We can furnish the above fittings in semi-steel or cast steel. Prices on application.



PLATE 162 STANDARD LATERALS



PLATE 163 REDUCING LATERALS

Size	Faced Only	Faced and Drilled	A or C	A and B	В	Dia, of Flgs	Faced Only	Faced and Drilled	C	Е	D	Size of Breh
	6.75	7.95	8	10 ½	21/2	6	7.75	8.95	8 0	8	2 1/2	
$2\frac{1}{2}$	6.95	8.15	91/2	12	2 1/2	7	8.00	9.20	8 of S	$9\frac{1}{2}$	$2\frac{1}{2}$	
3	7.65	9.05	10	13	3	$7\frac{1}{2}$	8.75	10.15	10 to	10	3	
3 1/2	9.00	10.70	$11\frac{1}{2}$	$14\frac{1}{2}$	3	8 1/2	10.35	12.05	111/2 0	$11\frac{1}{2}$	3	
4	10.00	12 00	12	15	3	9	11.50	13.50	11 🕉	11	2	2 1/2
$4\frac{1}{2}$	12.00	14.00	$12\frac{1}{2}$	$15\frac{1}{2}$	3	91/4	13.75	15.75	11	11	2	2 1/2
5	13.75	15.75	$13\frac{1}{2}$	17	$3\frac{1}{2}$	10	15.75	17.75	12	12	2	3
6	16.75	19.25	$14\frac{1}{2}$	18	$3\frac{1}{2}$	11	19.25	21.75	$13\frac{1}{2}$	$13\frac{1}{2}$	$1\frac{1}{2}$	3
7	23.00	26.00	$16\frac{1}{2}$	$20\frac{1}{2}$	4	$12\frac{1}{2}$	26.50	29.50	$14\frac{1}{2}$	15	11/2	3 1/2
8	26,50	29.75	$17\frac{1}{2}$	22	$4\frac{1}{2}$	$13\frac{1}{2}$	30.50	33.75	$14\frac{1}{2}$	$15\frac{1}{2}$	$1\frac{1}{2}$	4
9	37.50	42.00	$19\frac{1}{2}$	24	$4\frac{1}{2}$	15	43.00	47.50	$15\frac{1}{2}$	$16\frac{1}{2}$	$1\frac{1}{2}$	$4\frac{1}{2}$
10	42.00	47.50	$20\frac{1}{2}$	$25\frac{1}{2}$	5	16	48 .00	53.50	17	18	1	5
12	61.50	67.50	$24\frac{1}{2}$	30	$5\frac{1}{2}$	19	71.00	77.00	19	$20\frac{1}{2}$	1	6
14	91.00	98.50	27	33	6	21	105.00	112.50	21	23	1	7
15	103.00	112.00	$28\frac{1}{2}$	$34\frac{1}{2}$	6	22 1/4	118.00	127.00	22	24	1	7
16	120.00	130.00	30	$36\frac{1}{2}$	$6\frac{1}{2}$	23 ½	138.00	148.00	23	$25\frac{1}{2}$	1	8
18	157.00	169.00	32	39	7	25	180.00	192.00	25	$27\frac{1}{2}$	1	9
20	198.00	212.00	35	43	8	$27\frac{1}{2}$	228.00	242.00	27	$29\frac{1}{2}$	1	10
24	310.00	330.00	$40\frac{1}{2}$	$49\frac{1}{2}$	9	32	355.00	375.00	311/2	34 1/2	1/2	12

^{*} Dimensions are not changed by reduction in run or branch except when branch is size given in last column or smaller.

STANDARD CAST IRON FLANGES.

WORKING PRESSURES UP TO 125 POUNDS.



FLANGE, THREADED.



PLATE 170
FLANGE, BLIND.

Size	Faced Only	Faced and Drilled	Outside Diameter	Faced Only	Faced and Drilled
1	.55	.80	4		
1 ½ 1½ 2 ½ 3 ½ 4 ½ 4 ½ 5 6 7 8 9	.60	.85	$\frac{4}{5}$ $\frac{1}{2}$ $\frac{6}{7}$	** * *	
$1\frac{1}{2}$.65	.90	5	** **	
2	.75	1.00	6	1.15	1.40
$2\frac{1}{2}$.85	1.10	7	1.30	1.55
3	.95	1.25	71/2	1.40	1.70
$3\frac{1}{2}$	1.20	1.55	81/2	1.80	2.15
4	1.35	1.80	$ 7\frac{1}{2} $ $ 8\frac{1}{2} $ $ 9 $	2.00	2.45
$4\frac{1}{2}$	1.45	1.90	9 1/4	2.20	2.65
5	1.60	2.05	10	2.40	2.85
6	2.00	2.50	11	3.00	3.50
7	2.65	3.25	121/2	4.00	4.60
8	3.10	3.80	$\begin{array}{c} 13\frac{1}{2} \\ 15 \\ 16 \end{array}$	4.60	5.30
9	3.85	4.65	15	5.75	6.55
10	4.50	5.50	16	6.75	7.75
12	6.50	7.65	19	9.75	10.90
14	9.00	10.35	21	13.50	14.85
15	11.50	13.20	21	13.50	14.85
15	11.50	13.20	22 1/4	17.00	18.70
16	13.50	15.30	$23\frac{1}{2}$	20.00	21.80
18	16.00	18.00	25	24.00	26.00
20	19.00	21.50	27 1/6	28.00	30.50

We also make upon specification and at special prices cast steel and rolled steel flanges of the highest grade.

STANDARD CAST IRON REDUCING FLANGES

WORKING PRESSURES UP TO 125 POUNDS



PLATE 168 REDUCING FLANGE

Size	Faced Only	Faced and Drilled	Size	Faced Only	Faced and Drilled	Size	Faced Only	Faced and Drilled
2 x 7	1.45	1.70	4 x 11	3.30	3.80	8 x 16	7,45	8.45
2 x 7 2 x 71/2	1.55	1.85	4½ x 11	3.30	3.80	9×16	7.45	8.45
$2\frac{1}{2} \times 7\frac{1}{2}$	1.55	1.85	5 x 11	3.30	3.80	6×19	10.75	11.90
$2 \times 81_2$	2.00	2.35	4 x 12 1/2	4.40	5.00	7×19	10.75	11.90
2½ x 8½	2.00	2.35	4 1/2 x 12 1/2	4.40	5.00	8 x 19	10.75	11.90
3 x 8½	2.00	2.35	5 x 12 1/2	4.40	5.00	9×19	10.75	11.90
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	2.20	2.65	6 x 12 1/2	4.40	5.00	10×19	10.75	11.90
$\frac{2}{2}\frac{1}{2}$ x 9	2.20	2.65	2 x 13 ½	5.10	5.80	8 x 21	15.00	16.35
3 x 9	2.20	2.65	2 1/2 x 13 1/2	5.10	5.80	9×21	15.00	16.35
3½ x 9	2.20	2.65	3 x 13 1/2	5.10	5.80	10×21	15.00	16.35
2½ x 9¼	2.40	2.85	4 x 13 ½	5.10	5.80	12×21	15.00	16.35
3 x 9 14	2.40	2.85	5 x 13 ½	5.10	5.80	$8 \times 22 \frac{1}{4}$	19.00	20.70
3½ x 9¼	2.40	2.85	6 x 13 ½	5.10	5.80	$10 \times 22 \frac{1}{4}$	19.00	20.70
4 x 9 1/4	2.40	2.85	$7 \times 13\frac{1}{2}$	5.10	5.80	$12 \times 22 \frac{1}{4}$	19.00	20.70
	2.65	3.10	6 x 15	6.35	7.15	$14 \times 22 \frac{1}{4}$	19.00	20.70
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2.65	3.10	7 x 15	6.35	7.15	10 x 23 1/2	22.00	23.80
3 x 10	2.65	3.10	8 x 15	6.35	7.15	$14 \times 23 \frac{1}{2}$	22.00	23.80
3 ½ x 10	2.65	3.10	$2\frac{1}{2} \times 16$	7.45	8.45	15 x 23 1/2	22.00	23.80
4 × 10	2.65	3.10	3 x 16	7.45	8.45	12×25	26.50	28.50
4½ x 10	2.65	3,10	$3\frac{1}{2} \times 16$	7.45	8.45	14×25	26.50	28.50
2 x 11	3,30	3,80	4 × 16	7.45	8.45	15×25	26.50	28.50
2½ x 11	3.30	3,80	5 x 16	7.45	8.45	16×25	26.50	28.50
3 x 11	3.30	3.80	6 x 16	7.45	8.45	14 x 27 1/2	31.00	33.50
3 ½ x 11	3.30	3.80	7 x 16	7.45	8.45	15 x 27 1/2	31.00	33.50

We also make upon specification and at special prices cast steel and rolled steel flanges of the highest grade.



STANDARD TEMPLATES FOR DRILLING

WORKING PRESSURES UP TO 125 POUNDS

Size Flange	Thickness of Flange	Diameter of Bolt Circle	Number of Bolts	Size of Bolts	Length o Bolts
1 x 4	716	3	4	716	1½
$1\frac{1}{4} \times 4\frac{1}{2}$	1/2	3 3/8	4	$\frac{7}{16}$	$1\frac{1}{2}$
$1\frac{1}{2} \times 5$	9	3 7/8	4	$\frac{1}{2}$	1 3/4
2 x 6	5/8	4 3/4	4	5/8	2
$2\frac{1}{2} \times 7$	11 16	5 ½	4	5/8	21/4
$3 \times 7\frac{1}{2}$	3/4	6	4	5/8	$2\frac{1}{2}$
$3\frac{1}{2} \times 8\frac{1}{2}$	$\frac{13}{16}$	7	4	5/8	$2\frac{1}{2}$
4 x 9	$\begin{array}{c} 15 \\ 16 \end{array}$	$7\frac{1}{2}$	8	5/8	2 3/4
$4\frac{1}{2}$ x $9\frac{1}{4}$	$\frac{15}{16}$	7 3/4	8	$\frac{3}{4}$	3
5 x 10	$\tfrac{15}{16}$	81/2	8	$\frac{3}{4}$	3
6 x 11	1	$9\frac{1}{2}$	8	$\frac{3}{4}$	3
7 x $12\frac{1}{2}$	$1\frac{1}{16}$	10 3/4	8	$\frac{3}{4}$	3
8 x $13\frac{1}{2}$	11/8	1134	8	3/4	31/4
9×15	11/8	13 1/4	12	$\frac{3}{4}$	3 1/4
10 x 16	$1\frac{3}{16}$	14 1/4	12	7/8	3 1/2
12 x 19	1 1/4	. 17	12	7/8	3 3/4
14 x 21	$1\frac{3}{8}$	18 3/4	12	1	4 1/4
$15 \times 22\frac{1}{4}$	$1\frac{3}{8}$	20	16	1	4 1/4
16 x $23\frac{1}{2}$	$1\frac{7}{16}$	211/4	16	1	4 1/4
18 x 25	$1\frac{9}{16}$	$22\frac{3}{4}$	16	1 1/8	4 3/4
20 x 27 ½	$1\frac{11}{16}$	25	20	$1\frac{1}{8}$	5
24 × 32	$1\frac{7}{8}$	$29\frac{1}{2}$	20	1 1/4	$5\frac{1}{2}$

All drills are in multiples of fours, so they may be used at any quarter.
All holes straddle centre lines. We also drill to any desired template.



EXTRA HEAVY CAST IRON FLANGED FITTINGS

WORKING PRESSURES UP TO 250 POUNDS



PLATE 171 ELBOW



PLATE 172 45^O ELBOW

Size	Faced Only	Faced and Drilled	Centre to Face	Diam. of Flanges	Faced Only	Faced and Drilled	Centre to Face
2	4,50	5,40	5	61/2	5.00	5.90	3
	4.75	5.65	$5\frac{1}{2}$	7 1/2	5.25	6.15	$3\frac{1}{2}$
21/2	5.15	6.25	6	81/4	5.65	6.75	$3\frac{1}{2}$
3	6.10	7.35	6 1/2	9	6.75	8.00	4
3 1/2	6.75	8.25	7	10	7.50	9.00	$4\frac{1}{2}$
4		9.75	7 1/2	10 ½	9.00	10.50	4 1/2
4 1/2	8.25	10.85	8	11	10.35	11.85	5
5	9.35	13.40	81/2	121/2	12.50	14.50	5 1/2
6	11.40	18.00	9	14	16.50	18.75	6
7	15.75	20.50	10	15	19.00	21.50	6
8	18.00	28.85	10 1/2	16 1/4	26.75	30.10	61/2
9	25.50	-	11 1/2	17 1/2	30.00	34.00	7
10	28.50	32.50	13	201/2	44.00	48.50	8
12	42.00	46.50	15	23	62.00	67.50	81
14	62.00	67.50		24 1/2	70.00	77.00	9
15	70.00	77.00	15½	25 1/2	82.00	90.00	91
16	82.00	90.00	16 1/2	28	106.00	115.00	10
18	106.00	115.00	18		135.00	145.00	101
20	135.00	145.00	$19\frac{1}{2}$	$30\frac{1}{2}$			12
24	210.00	225.00	$22\frac{1}{2}$	36	210.00	225.00	12

All fittings furnished FACED ONLY unless otherwise specified.

We can furnish the above fittings in semi-steel or cast steel. Prices on application.



EXTRA HEAVY CAST IRON FLANGED FITTINGS

WORKING PRESSURES UP TO 250 POUNDS



PLATE 179 LONG RADIUS FLANGED ELBOW



PLATE 180 REDUCING ELBOW

LON	G RADIUS F	LANGED ELE	BOW		REDUCING	ELBOW	
Size	Faced Only	Faced and Drilled	Centre to Face	Diam. of Flanges	Faced Only	Faced and Drilled	Centre to Face
2	7.50	8.85	61/2	61/2	9.00	9.90	5
$2\frac{1}{2}$	8.00	9.35	7	$7\frac{1}{2}$	9.50	10.40	5 1/2
3	8.60	10.25	7 3/4	81/4	10.25	11.35	6
$3\frac{1}{2}$	10.25	12.15	81/2	9	12.25	13.50	6 1/2
4	11.25	13.50	9	10	13.50	15.00	7
$4\frac{1}{2}$	13.75	16.00	$9\frac{1}{2}$	10 ½			
5	15.50	17.75	10 1/4	11	18.75	20.25	8
6	19.00	22.00	$11\frac{1}{2}$	12 1/2	22.75	24.75	8 1/2
7	26.50	29.85	$12\frac{3}{4}$	14	31.50	33.75	9
8	30.00	33.75	14	15	36.00	38.50	10
9	42.50	47.50	151/4	16 1/4	********		10
10	47.75	53.75	16 ½	17 1/2	57.00	61.00	111/2
12	70.00	76.75	19	201/2	84.00	88.50	13
14	103.50	111.75	211/2	23	105.00	110.50	15
15	117.00	127.00	22 34	24 ½	120.00	127.00	15 1/2
16	137.00	149.00	24	25 1/2	135.00	143.00	16 1/2
18			261/2	27		110.00	-
20			29	29 1/2			*****
24			34	34 1/4			
				3.74			elece a

All fittings furnished FACED ONLY unless otherwise specified.

We can furnish the above fittings in semi-steel or cast steel. Prices on application.



EXTRA HEAVY CAST IRON FLANGED FITTINGS.

WORKING PRESSURES UP TO 250 POUNDS



PLATE 181 BASE ELBOW



PLATE 182 REDUCER.

Size	Faced Only	Faced and Drilled	Centre to Face	Centre to Base	Size	Face to Face
4	13.50	15.00	7	7	91/ 9	E 1/
$4\frac{1}{2}$	16.50	18.00	7 ½	7 1/4	$2\frac{1}{2}$ x 2 and under 3 x $2\frac{1}{2}$ and under	5½ 6
5	18.75	20.25	8	$7\frac{1}{2}$	$3\frac{1}{2}$ x 3 and under 4 x $3\frac{1}{2}$ and under	$\frac{61/2}{7}$
6	22.75	24.75	81/2	8	$4\frac{1}{2}$ x 4 and under 5 x $4\frac{1}{2}$ and under	7½ 8 9
7	31.50	33.75	9	834	6 x 5 and under 7 x 6 and under 8 x 4 and over 8 x 3½ and under 9 x 4 and over	$\frac{9}{10}$
8	36.00	38.50	10	91/4	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	
9	51.00	54.35	101/2	10	9 x 3½ and under	$11\frac{1}{2}$
10	57.00	61.00	11½	10 ½	10×5 and over $10 \times 4 \frac{1}{2}$ and under	$\frac{11}{17}$
12	84.00	88.50	13	11	12 x 6 and over 12 x 5 and under	$\frac{12\frac{3}{4}}{18}$
4	105.00	110.50	15	14	14 x 8 and over 14 x 7 and under	$\frac{14}{18}$
5	120.00	127.00	151/2	14 1/2	15 x 10 and over 15 x 9 and under	18 15 22 15 24
6	135.00	143.00	16 1/2	15 1/4	16 x 10 and over 16 x 9 and under	15 24
			/2		18 x 10 and over 18 x 9 and under 20 x 12 and over 20 x 12 and under 24 x 12 and over 24 x 10 and under	$ \begin{array}{c} 16\frac{1}{2} \\ 24 \\ 18 \\ 30 \\ 20\frac{1}{2} \\ 36 \end{array} $

All fittings furnished FACED ONLY unless otherwise specified.

We can furnish the above fittings in semi-steel or east steel. Prices on application.

Taper and Eccentric Flanged Reducers. Prices on application.



EXTRA HEAVY CAST IRON FLANGED FITTINGS

WORKING PRESSURES UP TO 250 POUNDS



PLATE 173 TEE.



PLATE 174 REDUCING TEE.

_			TEE.			REDUCING TEE.						
Size	Face Onl;		Face	to Face of	Dia. of Flgs	Faced Only	Faced and Drilled	Face of	Centre to Face of Outlet	Size of Out- let.		
2	6 8	7.8	5 5	5	6 1/2	7.50	8.85		ie 5			
2^{1}	6.9	8.2	5 51	$5\frac{1}{2}$	71	8.00	9.35	5 3 1/2 5 1/2	smaller, ier cases			
3	7.5	9.1.	5 6	6	8 1/2	8.60	10.25	these dimensions of 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	or sm other let.			
31	8.9	0 10.80	6 1/2	6 1/2	9	10.25	12.15	n in run. These dimedimensions 9 6 75				
4	9.7	5 12.00	7	7	10	11.25	13.50	0.0	column In all e of out			
41	2 12.0	0 14.2	7 1/2	7 1/2	10 ½	13.75	16.00	sedus Case	0 71/6			
5	13.5	0 15.75	8	8	11	15.50	17.75	changed by rest column or st column or st in all other ce of run.	in last outlet. e to fac			
6	16.5	0 19.50	81/2	8 1/2	12 1/2	19.00	22.00	pa i s ½	E 10 B 1/2			
7	23.0	0 26.35	9	9	14	26.50	29.85	tang coluction a fin a of ri	size given in to face of out vern centre to 8 8 1/2			
8	26 0	0 29.75	10	10	15	30.00	33.75	or ast	fac la			
9	37.0	0 42.00	10 ½	$10\frac{1}{2}$	16 !	42.50	47.50	[二五百 0 10 ½]。	govern govern 10 10 1/2			
0	41.50	47.50	11 1/2	$11\frac{1}{2}$	$17\frac{1}{2}$	47.75	53.75	of II Te of a	very centre to the transfer of	6		
2	6100	67.75	13	13	$20 \frac{1}{2}$	70.00	76.75	dimensions ar of size given fre to face of sovern centre	13 L	8		
4	90.00	98.25	15	15	23	103.50	111.75		tht 12	9		
5	102.00	112.00	15 ½	$15\frac{1}{2}$	$24\frac{1}{2}$	117.00		ace din intlet of centre gs govern 12 12 12 12 12 12 12 12 12 12 12 12 12 1	0 SE 15 1/2	9		
3	119.00	131.00	$16\frac{1}{2}$	$16\frac{1}{2}$	251/2	137.00	149.00	face dim outlet of n centre lings gove 1975 1975 1975 1975 1975 1975 1975 1975	nio aver 13 13 15 15 15 15 16 1/2	10		
3	154.00	168.00	18	18	28	177.00	191.00	to face as outle overn cen fittings 191 172 173 173 173 173 173 173 173 173 173 173	nens ns o	12		
	195.00	210.00	$19\frac{1}{2}$	$19\frac{1}{2}$	$30\frac{1}{2}$	225.00	240.00	Centre ting ha ons gov aight f	din ision	14		
	305.00	328.00	$22\frac{1}{2}$	$22\frac{1}{2}$	36 3	350.00	373.00	Centre to fitting has sions gover straight fitt	these dimensions of stra	15		

All fittings furnished FACED ONLY unless otherwise specified.

We can furnish the above fittings in semi-steel or cast steel. Prices on application.



EXTRA HEAVY CAST IRON FLANGED FITTINGS

WORKING PRESSURES UP TO 250 POUNDS



PLATE 175 CROSS



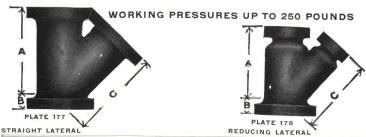
PLATE 176 CROSS REDUCING

Size	Faced Only	Faced and Drilled	Cent. to Face Run	Cent. to Face Out.	Dia. of Flgs	Faced Only	Faced and Drilled	Centre to Face Run	Centre to Face Outlet	Size of Out- let
2	10.00	11.80	5	5	6 ½	11.50	13.30		smaller, er cases	
$2\frac{1}{2}$	10.50	12.30	$5\frac{1}{2}$	5 1/2	7 1/2	12.00	13.80	er, t s din	2 d s 5 ½	
3	11.50	13.75	6	6	81/4	13.25	15.50	ases 6	oth et. 6	
$3\frac{1}{2}$	13.50	16.00	$6\frac{1}{2}$	$6\frac{1}{2}$	9	15.50	18.00	tion tion 6	1 4 4	
4	15.00	18.00	7	7	10	17.00	20.00	duc n ol othe n.		
$4\frac{1}{2}$	18.00	21.00	71/2	71/2	10 ½	21.00	24.00	by reduction in column or small all other cases of run.	last let.	
5	20.50	23.50	8	8	11	23.50	26.50	Se o	8 8 EE	
6	25.00	29.00	81/2	81/2	12 1/2	29.00	33.00	changed by reduning trun. In all others to face of run.	d 0	
7	35.00	39.50	9	9	14	40.00	44.50	dall'	e gi.	
8	40.00	45.00	10	10	15	46.00	51.00	dimensions are not changed so of the size given in last centre to face of run. In tings govern centre to face of the control o	ts of size tree to face to face to face to face 10 10 1/2	
9	56.00	62.75	101/2	10 ½	161/4	65.00	71.75	f of face	2 so 10 1/2	
10	63.00	71.00	111/2	111/2	171/2	72.00	80.00	sions al he size to fa govern	2 5 6	1
12	92.00	101.00	13	13	20 ½	106.00	115.00	dimension s of the centre t tings gov	5 5	8
14	136.00	147.00	15	15	23	158.00	169.00	diments of the central trings	g 64 15	9
15	155.00	169.00	15 ½	151/2	24 1/2	177.00	191.00	tre to face di have outlets ons govern c straight fitti 19	strais 8 trais 8 trais	9
6	180.00			161/2	251/2	207.00	223.00	3 0 80 = 16	fittin nsion of s	10
18	235.00	NAME OF TAXABLE PARTY.	18	18	28	270.00	COCCACACACACACACACACACACACACACACACACACA	Centre to gs have nsions go of straig		12
20	300.00	320.00	191/2	19 ½	30 ½	345.00		Cen ngs ensic s of	When e dime	14
	465.00	495.00		22 1/2	36		565.00	Centre fittings have dimensions sions of stra	When these dime dimensions	15

All fittings furnished FACED ONLY unless otherwise specified. We can furnish the above fittings in semi-steel or east steel. Prices on application



EXTRA HEAVY CAST IRON FLANGED FITTINGS



2	THAIGHT EATERIAL							HEDDEING LATERAL								
Size	Faced Only	Faced and Drilled	Inc	re to	Face to Face Inch A and B	Dia	Only	l Faced and Drilled	1 I	ntre Fac nch	e to e es B *	Centre to Face of Out- let C	Size Br.,			
2	10.00	11.80	9	2 1/2	111/2	6 1/2	11.50	13.30	9	*	* 2 ½	9				
$2\frac{1}{2}$	10.50	12,30	10 1/2	2 1/2	13	7 1/2	12.00	13.80	10 1/2	Note	2 1/2	10 1/2				
3	11.50	13.75	11	3	14	81/4	13.25	15.50	11		3	11				
31/2	13.50	16.00	$12\frac{1}{2}$	3	15 1/2	9	15.50	18.00	12 ½	See Foot	3	121/2				
4	15.00	18.00	13 ½	3	$16\frac{1}{2}$	10	17.00	20,00	12	S	2	13	21/2			
4 1/2	18.00	21.00	$14\frac{1}{2}$	3 1/2	18	10 1/2	21.00	24.00	12 1/2		$2\frac{1}{2}$	13 ½	21/2			
5	20.50	23.50	15	$3\frac{1}{2}$	$18\frac{1}{2}$	11	23,50	26.50	13 ½		21/2	$14\frac{1}{2}$	3			
6	25.00	29.00	$17\frac{1}{2}$	4	$21\frac{1}{2}$	12 ½	29.00	33.00	$14\frac{1}{2}$		21/2	$15\frac{1}{2}$	3			
7	35.00	39.50	19	$4\frac{1}{2}$	$23\frac{1}{2}$	14	40.00	44.50	$15\frac{1}{2}$		21/2	16 1/2	$3\frac{1}{2}$			
8	40.00	45.00	$20\frac{1}{2}$	5	$25\frac{1}{2}$	15	46.00	51,00	$17\frac{1}{2}$		21/2	181/2	4			
9	56.00	62.75	$22\frac{1}{2}$	5	$27 \frac{1}{2}$	16 1/4	65.00	71.75	181/2		2 1/2	$19\frac{1}{2}$	4 1/2			
10	63.00	71.00	24	5 1/2	$291\!\!/_{\!2}$	$17\frac{1}{2}$	72.00	80.00	$20\frac{1}{2}$		21/2	$21\frac{1}{2}$	5			
12	92.00	101.00	$27\frac{1}{2}$	6	$33\frac{1}{2}$	20 ½	106.00	115.00	23 ½		21/2	$24\frac{1}{2}$	6			
14	136.00	147.00	31	$6\frac{1}{2}$	$37 \frac{1}{2}$	23	158.00	169.00	$26\frac{1}{2}$		21/2	27 1/2	7			
15	155.00	169.00	33	$6\frac{1}{2}$	$39\frac{1}{2}$	$24\frac{1}{2}$	177.00	191.00	$27\frac{1}{2}$		21/2	281/2	7			
16	180.00	196.00	$34\frac{1}{2}$	$7\frac{1}{2}$	42	$25 \frac{1}{2}$	207.00	223.00	29		3	30 1/2	8			
18	235.00	253.00	$37\frac{1}{2}$	8	451/2	28	270.00	288.00	31		3	321/2	9			
20	300.00	320.00	$40\frac{1}{2}$	81/2	49	30 ½	345.00	365.00	34		3	36	10			
24	465.00	495.00	$47\frac{1}{2}$	10	57 ½	36	535.00	565.00	41		3	43	12			

^{*} Dimensions are not changed by reduction in run or branch except when branch is size given in last column or smaller.



EXTRA HEAVY CAST IRON FLANGES.

WORKING PRESSURES UP TO 250 POUNDS.







PLATE 184 SOLID

Size	Faced Only	Faced and Drilled	O. D. of Flanges	Faced Only	Faced and Drilled
1	.95	1.30	4 1/2		
11/4	1.00	1.35	5	****	
1 ½	1.10	1.45	6	1.65	2.00
2	1.25	1.60	6 ½	1.90	2,25
$2\frac{1}{2}$	1.40	1.75	7 ½	2.10	2 45
3	1.60	2.05	81/4	2.40	2.85
3 1/2	2.00	2.55	9	3.00	3.55
4	2.25	2,95	10	3.35	4.05
4 1/2	2.40	3.10	10 ½	3.60	4.30
5	2.65	3.35	11	4.00	4.70
6	3.30	4.05	12 ½	5.00	5.75
7	4.40	5,30	14	6.60	7.50
8	5.10	6.15	15	7.65	8.70
9	6.30	7.50	161/4	9.50	10.70
10	7.40	8,90	$17\frac{1}{2}$	11.00	12.50
12	10.75	12.50	20 ½	16.00	17.75
14	15.00	17.00	23	22.50	24.50
15	19.00	21.50	24 ½	28.50	31.00
16	22.25	25.00	25 ½	33,50	36.25
18	26.00	29.00	28	39.00	42.00
20	31.00	35.00	30 ½	43.00	50.00
24	45.00	50.00	36	67.00	72.00

We also make upon specification and at special prices cast steel and rolled steel flanges of the highest grade,



EXTRA HEAVY CASTIRON REDUCING FLANGES

WORKING PRESSURES UP TO 250 POUNDS



PLATE 4921

Size Inches	Price Faced Each	Price Faced and Drilled Each	Size Inches	Price Faced Each	Price Faced and Drilled Each
1½ x 7½ 2 x 7½ 2 x 7½ 2 x 8¼ 4 2 x 8¼ 2 ½ x 8¼ 2 ½ x 9 3 x 9 3 x 9 3 ½ x 10 4 x 10 3 ½ x 11 3 ½ x 11 3 ½ x 11 4 ½ x 12 4 ½ x 12 4 ½ x 12 4 ½ x 12 4 ½ x 14 5 x 14	2.30 2.30 2.65 2.65 2.65 3.30 3.30 3.70 3.70 4.00 4.00 4.00 4.00 4.40 4.40 4.40 4	2.65 2.65 3.10 3.10 3.10 3.85 3.85 3.85 4.40 4.40 4.70 4.70 4.70 4.70 5.10 5.10 5.10 5.10 5.10 5.10 5.10 5.1	5 x 16 14 6 x 16 14 7 x 16 14 8 x 16 14 8 x 17 1/2 6 x 17 1/2 8 x 17 1/2 9 x 17 1/2 9 x 17 1/2 9 x 20 1/2 10 x 20 1/2 8 x 20 1/2 10 x 20 1/2 11 x 20 1/2 12 x 21 1/2 12 x 21 1/2 12 x 25 1/2 14 x 25 1/2 15 x 28 16 x 28	10.50 10.50 10.50 10.50 12.00 12.00 12.00 12.00 12.00 12.00 12.00 17.50 17.50 17.50 25.00 25.00 25.00 25.00 31.50 31.50 31.50 37.00 37.00 43.00 43.00 43.00 43.00 43.00 43.00	11.70 11.70 11.70 11.70 13.50 13.50 13.50 13.50 13.50 19.25 19.25 19.25 19.25 27.00 27.00 27.00 27.00 34.00 34.00 34.00 34.00 34.00 34.00 34.00 34.00 34.00 34.00 34.00 34.00 34.00 34.00 35.00
6 x 14 3 x 15 3½ x 15 4 x 15 5 x 15 6 x 15 7 x 15 4 x 16¼	8.40 8.40 8.40 8.40 8.40 8.40	8.15 9.45 9.45 9.45 9.45 9.45 9.45 11.70	15 x 30 ½ 16 x 30 ½ 18 x 30 ½ 16 x 33 18 x 33 20 x 33 18 x 36 20 x 36	51.00 51.00 51.00 60.00 60.00 60.00 74.00 74.00	55.00 55.00 55.00 65.00 65.00 65.00 79.00

Extra Heavy Reducing Companion Flanges are the same thickness and are drilled to same template as our regular Extra Heavy Companion Flanges of corresponding outside diameter.

When ordering Reducing Companion Flanges be particular to give both the pipe size and outside diameter.

Note.—Flanges will always be furnished faced only, unless otherwise ordered.



EXTRA HEAVY TEMPLATES FOR DRILLING

WORKING PRESSURES UP TO 250 POUNDS

Size Inches	Diameter of Flanges	Thickness of Flanges	$rac{ ext{Bolt}}{ ext{Circle}}$	Number of Bolts	Size of Bolts	Lengtl of Bolts
1	4 ½	11 16	31/4	4	1/2	2
$1\frac{1}{4}$	5	3/4	$3\frac{3}{4}$	4	1/2	21/4
$1\frac{1}{2}$	6	13 16	$4\frac{1}{2}$	4	5/8	21/2
2	$6\frac{1}{2}$	7/8	5	4	5/8	21/2
$2\frac{1}{2}$	$7\frac{1}{2}$	1	$5\frac{7}{8}$	4	3/4	3
3	81/4	11/8	$6\frac{5}{8}$	8	34	31/4"
3 1/2	9	$1\frac{3}{16}$	7 1/4	8	3/4	31/4
4	10	11/4	7 7/8	8	3/4	$3\frac{1}{2}$
$4\frac{1}{2}$	10 ½	1 16	$8\frac{1}{2}$	8	3/4	$3\frac{1}{2}$
5	11	1 3/8	$9\frac{1}{4}$	8	3/4	3 3/4
6	$12\frac{1}{2}$	$1\frac{7}{16}$	10%	12	3/4	3 3/4
7	14	$1\frac{1}{2}$	$11\frac{7}{8}$	12	7/8	4
8	15	1 5/8	13	12	7/8	4 1/4
9	161/4	1 3/4	14	12	1	4 3/4
10	17 ½	1 7/8	$15\frac{1}{4}$	16	1	5
12	20 ½	2	$17\frac{3}{4}$	16	11/8	$5\frac{1}{4}$
14	23	21/8	$20\frac{1}{4}$	20	11/8	$5\frac{1}{2}$
15	$24\frac{1}{2}$	$2\frac{3}{16}$	$21\frac{1}{2}$	20	11/4	$5\frac{3}{4}$
16	$25\frac{1}{2}$	21/4	$22\frac{1}{2}$	20	1 1/4	6
18	28	2 3/8	243/4	24	11/4	$6\frac{1}{4}$
20	$30\frac{1}{2}$	$2\frac{1}{2}$	27	24	1 3/8	$6\frac{1}{2}$
24	36	2 3/4	32	24	1 5/8	71/4



CAST IRON LONG TURN FLANGED FITTINGS

FOR 125 POUNDS WORKING PRESSURE

No. 1



PLATE 150 WATER ELBOW

No. 2



PLATE 151
DOUBLE BRANCH WATER ELBOW

	WAT	ER ELBOW	Do	UBLE BRANCH	WATER EL	BOW
Size Inches	Price Faced Each	Price Faced and Drill- ed Each.	Price Faced Each	Price Faced and Drilled Each	Price Reduc- ing Faced Each *	Price Reduc- ing Faced and Drilled Each *
2	5.25	6.25	8.00	9.50	9.25	10.75
$\frac{1}{2}\frac{1}{2}$	5.50	6.75	8.25	10.00	9.50	11 25
3	6.50	7.75	9.50	11.25	11.00	12 75
3 1/2	7.50	8.75	11.00	12.75	12.50	14.25
4	8.00	10.00	12 00	15.00	13.75	16.75
4½ 5 6 7 8 9	10 00	12.00	15.00	18.00	17 25	20.25
5	11.00	13.00	16.25	19 25	18.75	21 75
6	13.25	15.50	20.00	23 00	23 00	26.00
7	17.50	21.00	26.50	32 00	30 00	35.50
8	22.00	26.00	33.50	39.00	38.50	44.00
9	29.00	33.00	43.50	50.00	50.00	56.50
10	36.00	40.00	53.50	60.00	61.50	68.00
12	49.00	55.00	74.00	83.00	85.00	94 00
14	64.00	71.00	96.00	107.00	110.00	121.00
15	80.00	88.00	120.00	132.00	138.00	150.00
16	94.00	103.00	140.00	153.00	160.00	173.00
18	120,00	130.00	178.00	193.00	205.00	220.00
20	150.00	164.00	225.00	245.00	258.00	278.00
22	180.00	200.00	265.00	295.00	305.00	335.00
24	225.00	245.00	335.00	365.00	385.00	415.00

Note.—Flanged Fittings will always be furnished faced only unless otherwise ordered.

Note * —These Fittings are furnished in reducing sizes by bolting on Reducing Companion Flanges, the price of same not being included in above lists.

Dimensions of Flanges, Bolt Circle, and size of bolts, same as Standard Flanged Fittings.



CAST IRON LONG TURN FLANGED FITTINGS

FOR 125 POUNDS WORKING PRESSURE

No. 3



PLATE 152
WATER TEE, SINGLE SWEEP

No. 4



PLATE 153 WATER CROSS

	WA	TER TEE,	Single Sw	EEP		No. 4, W	ATER CRO	SS
Size Ins.	Price Faced Each	Price Faced and Drilled Each	Faced Reduc- and ing Drilled Faced		Price Faced Each	Price Faced and Drilled Each	Price Reduc- ing Faced Each*	Price Reduc- ing Faced and Drilled Each*
2	8.00	9.50	9.25	10.75	11.00	13.00	12.75	14.75
$\frac{2}{3}\frac{1}{2}$	8.25	10.00	9.50	11.25	12.50	15.00	14.50	17.00
3	9.50	11.25	11.00	12.75	15.00	17.50	17.00	19.50
3 1/2	11.00	12.75	12.50	14.25	17.50	20.00	19.75	22.50
4	12.00	15.00	13.75	16.75	20.00	24.00	23.00	27.00
4 1/2	15.00	18.00	17.25	20.25	24.00	28.00	27.00	31.00
5	16.25	19.25	18.75	21.75	27.00	31.00	30.00	34.00
6 7 8 9	20.00	23.00	23.00	26.00	35.00	39.00	38.00	42.00
6	26.50	32.00	30.00	35.50	45.00	52.00	50.00	57.00
0	33.50 43.50	39.00 50.00	38.50 50.00	$\frac{44.00}{56.50}$	56.00 70.00	64.00 78.00	63.00 78.00	71.00 86.00
10	53.50	60.00	61.50	68.00	84.00	92.00	94.00	102.00
12	74.00	83.00	85.00	94.00	115.00	127.00	129.00	141.00
14	96.00	107.00	110.00	121.00	150.00	164.00	167.00	181.00
15	120.00	132.00	138.00	150.00	190.00	205.00	212.00	227.00
16	140.00	153.00	160.00	173.00	220.00	237.00	245.00	262.00
18	178.00	193.00	205,00	220.00	275.00	295.00	305.00	325.00
20	225.00	245.00	258.00	278.00	350.00	375.00	388.00	413.00
22	265.00	295.00	305.00	335.00	420.00	460.00	475.00	515.00
24	335.00	365.00	385.00	415.00	520.00	560.00	580,00	620.00

Note.—Flanged Fittings will always be furnished faced only unless otherwise ordered.

Note *—These Fittings are furnished in reducing sizes by bolting on Reducing Companion Flanges, the price of same not being included in above lists.

Dimensions of Flanges, Bolt Circle, etc., same as for Standard Flanged Fittings.



CAST IRON LONG TURN FLANGED FITTINGS

FOR 125 POUNDS WORKING PRESSURE

No. 5



PLATE 154
WATER TEE DOUBLE SWEEP

No. 6



PLATE 155 WATER CROSS SWEEP

	No. 5 V	VATER TEI	e, Double	SWEEP		No 6, WA	TER CROSS	3
Size Ins.	Price Faced Each	Price Faced and Drilled Each	Price Reduc- ing Faced Each*	Price Reduc- ing Fac- ed and Drilled Each*	Price Faced Each	Price Faced and Drilled Each	Price Reduc- ing Faced Each*	Price Reduc- ing Faced and Drilled Each*
2	8.00	9 50	9 25	10.75	11 00	13 00	12.75	14 75
$\frac{2\frac{1}{2}}{3}$	8.25	10 00	9.50	11.25	12.50	15.00	14.50	17.00
3	9.50	11.25	11.00	12 75	15 00	17.50	17.00	19 50
31/2	11,00	12.75	12.50	14.25	17 50	20,00	19 75	22.50
4	12.00	15.00	13.75	16.75	20.00	24,00	23.00	27,00
$\frac{41}{2}$ $\frac{5}{6}$	15.00	18.00	17 25	20.25	24.00	28.00	27.00	31,00
5	16.25	19.25	18.75	21.75	27.00	31.00	30.00	34,00
6	20.00	23.00	23.00	26.00	35.00	39 00	38.00	42.00
7	26.50	32.00	30.00	35.50	45.00	52.00	50.00	57.00
7 8 9	33.50	39.00	23.50	44.00	56,00	64.00	63.00	71.00
	43.50	50.00	50.00	56.50	70.00	78.00	78.00	86.00
10	53.50	60.00	61.50	68.00	84.00	92.00	94.00	102.00
12	74.00	83.00	85.00	94.00	115.00	127.00	129.00	141.00
14 15	96.00	107.00	110.00	121 00	150.00	164.00	167.00	181.00
16	120.00	132.00	138.00	150.00	190.00	205.00	212.00	227.00
18	$140.00 \\ 178.00$	153.00	160.00	173.00	220.00	237.00	245.00	262 00
20	225.00	193.00	205.00	220.00	275.00	295.00	305.00	325 00
22	265.00	245.00	258.00	278.00	350.00	375.00	388.00	413.00
24	335.00	295.00	305.00	335.00	420.00	460.00	475.00	515.00
w-x	00,666	365.00	385.00	415.00	520.00	560.00	580.00	620.00

Note,—Flanged Fittings will always be furnished faced only unless otherwise ordered.

Note *—These fittings are furnished in reducing sizes by bolting on Reducing Companion Flanges, the price of same not being included in above lists.

Dimensions of flanges, bolt circle, number and size of bolts, same as for Standard Flanged Fittings.

CAST IRON HOOK PLATES, COIL STANDS, ETC.



PLATE 5304 HOOK PLATE



PLATE 5305 EXPANSION PLATE





PLATE 5306 SINGLE HOOK PLATE

PLATE 5307 COIL STAND

Number of Branches	1	2	3	4	5	6	7	8	9	10	11	12
34 inch Hook Plates	.08	.16	.21	.24	.28	.34	.40	.45	.50	.56	.68	.72
1 inch Hook Plates	.09	.18	.23	.26		.38						1.00
1¼ inch Hook Plates 1½ inch Hook Plates	.15	.21	.43	.32		.52				$\frac{1.20}{1.55}$		
2 inch Hook Plates	.22	.43	.65	.90	1.15	1.35	1.75	2.00	2.25	2.50	2.75	3.00
34 inch Expansion Plates 1 inch Expansion Plates	15	.23	35	.45	.55		.77			$\frac{1.25}{1.35}$		
11/4 inch Expansion Plates	.17	.27	.40	.60	.70	.80	.90	1.15	1.30	1.50	1.70	2.00
1½ inch Expansion Plates ¾ inch Coil Stands, per pr.	.25	.40	.60	.75	.90					2.00		
inch Coil Stands, per pr.				.60		.75		1.30		$\frac{1.25}{1.60}$		2.05

PIPE SADDLES AND HANGER ROLLS



PLATE 5308 MALLEABLE IRON PIPE SADDLE



PLATE 5309 CAST IRON HANGER ROLL

PIPE SADDLES

			DDLLS	Maria de la companya		
Size of PipeInches	$1\frac{1}{2}$	2	2 ½	3	3 ½	4
Tapped for Pipe. Inches Price each		½ to 1½ 1.00	3/4 to 1 1/2 1.25	3/4 to 2 1.25	3/4 to 2 1.40	3/4 to 2 1.50
Size of PipeInches	$4\frac{1}{2}$	5	5	6	6	7
Tapped for PipeInches Price each		3/4 to 2 2.75	$2\frac{1}{2}$ and 3 2.75	3/4 to 2 2.75	2½ to 4 5.75	1 to 4 6.50
Size of PipeInches	8	9	10	10	12	12
Tapped for Pipe. Inches Price each		1½ to 4 8.50	1½ to 4 10.00	4½ to 6 10.00	1½ to 4 14.00	4½ to 6 14.00

LIA	NIC	FD	DO	110

Size of PipeInches	1	11/4	1 1/2	2	2 1/2	3	3 1/2	4	$ 4\frac{1}{2} $	5	6	7	8
Hanger Rollseach	.06	.07	.08	.13	.15	.18	.21	.21	.24	.24	.27	.36	.44

PIPE HANCERS

MALLEABLE IRON BALL JOINT PIPE HANGERS







PLATE 7806

PLATE 7807

PLATE 7808

SizeInches	1/2	3/4	1	11/4	11/2	2	21/2	3
No. 1. each No. 2. each No. 3. each		.18 .58 .33	.18 .58 .33	.20 .60 .35	.22 .62 .37	.25 .65 .40	.30 .70 .55	.35 .75 .62
SizeInches	$3\frac{1}{2}$	4	5	6	7	8	10	12
No. 1. each No. 2. each No. 3. each	.90	.60 1.00 .98	.70 1.10 1.17	.90 1.30 1.40	1.20 1.60 1.70		1.80 2.20 2.20	2.10 2.50 2.50

State size of Beam when ordering No. 2 Hangers.

KWICKUP PIPE HANGER



PLATE 7809

No	23	20	18	16	14	12
100 foot rolls	3.20	3.80	4.50	5.80	6.80	8.40

50 bolts with each 100 feet.



PIPE HANGERS



PLATE 3340 SPLIT RING EXTENSION PIPE HANGER

SOLID RING EXTENSION PIPE HANGER

SPLIT RING EXTENSION PIPE HANGERS

31 11			_	- / .								_		
SizeInches	3/8	1/2	3/4	1	1 1/4	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	4	5	6	7	8
Tapped for	1/4	1/4	1/4	1/4	1/4	1/4	1/4	3/8	1/2	1/2	3/4	3/4	1	1
Plain Iron, complete Galv. Iron, complete,	.22	.22	.27	.32	.35	.40	.50	.70 .80	.90 1.00	$\frac{1.10}{1.25}$	$\frac{1.40}{1.75}$	$\frac{1.90}{2.25}$	$\frac{2.50}{3.00}$	$\frac{3.00}{3.50}$

SOLID RING EXTENSION PIPE HANGERS

SULIL	, ,	1114	G I	- ^ !	FIA	310	114		- 1	1711	u = 11			
SizeInches	34	1	1 1/4	1 1/2	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	4 1/2	5	6	7	8
Tapped for	1/4	1/4	1/4	1/4	1/4	1/2	1/2	1/2	1/2	1/2	1/2	$\frac{1}{2}$	$\frac{1}{2}$	1/2
Plain, less Nipples Galv., less Nipples	.17	.18	.19	.25	. 29	.36	.44	.55	.63 .95	.90 1.35	$\frac{1.12}{1.65}$	$\frac{1.35}{2.00}$	$\frac{1.80}{2.75}$	$\frac{2.25}{3.50}$



PLATE 3342 MALLEABLE IRON PIPE HANGER



PLATE 3343 SOLID RING PIPE HANGER

MALLEABLE IRON PIPE HANGERS

SizeInches	3/8	1/2	34	1	1 1/4	1 1/2	2	$2\frac{1}{2}$	3	4	5	6	7	8
Tapped for	1/4	1/4	1/4	1/4	1/4	1/4	1/4	3/8	1/2	1/2	34	34	1	1
Plain Iron Each Galv. Iron Each	.15	.15	.18	.22	.27	.35	.40	.45	.50	. 65 . 80	1.00	$\frac{1.50}{2.00}$	$\frac{2.00}{2.50}$	$\frac{2.50}{3.00}$

SOLID RING PIPE HANGERS

SizeInches	3/8	1/2	34	1	1 1/4	11/2	2
Plain Iron	5.00 6.50	5.00 6.50	5.80 7.00	7.75	10.00 12.00	14.00 16.00	22.00 25.00



HINGED RING HANGER AND BOLT



DI	Δ	T	E	5	31	2

SizeInches	1/2	3/4	1	11/4	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	3 1/2	4
Hinged Ring Hanger and Bolt each	.17	.17	.19	.21	.23	.25	.27	.29	.33	.35
SizeInches	4 1/2	5	6	7	8	9	10	11	12	
Hinged Ring Hanger and Bolteach	.37	.39	.43	. 68	.93	1.15	1.45	1.65	1.95	

EXTENSION BARS



PLATE 5313

Number	1	2	3	4	5
For Pipe Inches	1/4 to 1 1/2	2 to 3	3½ to 6	7 to 8	9 to 12
Price Per Foot	.08	.09	.10	.20	.28

Bolt holes are half inch apart; stock lengths, ten feet.

AND BOLT



I BEAM CLAMP MALLEABLE IRON BEAM CLAMP



PLATE 5315

Size of I BeamInches	2	3	4	5	6	7	8
$\begin{array}{cccccccccccccccccccccccccccccccccccc$.22 .50 .70	.24 .55 .77	.26 .60 .84	.28 .65 .91	.30 .70 .98	.32 .75 1.05

WALLEABLE	IRON	00	- W IAI	CLA	IVI			
Size of I Beam	Inches	2	3	4	5	6	7	8
Price.	each	.40	,40	.40	.50	.50	. 50	. 50



WROUGHT NIPPLES

BLACK

RIGHT HAND







PLATE D-839 LONG NIPPLE

TABLE OF SIZES AND LENGTHS

LENG	ETH, INCHES	sət	Pri	CES		PR	ICES	ог Е	XTRA	Long	Nippl	ES	
Close	Long	Size, Inches	Close or Short	Long	INCHES 4 5 6 7 8 9 10 11								
0 0		02	S S	L	4	5	6	7	8	9	10	11	12
3/4 1 1/2 2 1/2 3/4 4 4 1/2 2 1/2 3/4 4 4 4 1/2 2 1/2 3/4 4 4 4 1/2 2 1/2 3/4 3/4 5 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	22 2 ½3 3 3½4 4 ½5 5 6 6 6 1 ½5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	.04 .04 .04 .05 .06 .08 .11 .13 .18 .39 .48 .75 .1.25 1.25 1.25 1.25 5.25 6.76	6.50	.07	.08 .08 .08 .10 .11 .15 .20 .25 .32	.10 .10 .10 .12 .13 .18 .24 .29 .38 .68 .85	.12 .12 .14 .17 .23 .29 .36 .50 .90 1.08 1.30 1.52 2.25 2.25 2.58 3.05 4.05	.14 .14 .16 .18 .25 .33 .40 .54 .9 1.20 1.45 1.69 2.53 3.35 4.45 5.05	.15 .15 .18 .20 .28 .36 .45 .59 1.06 1.33 1.60 1.87 2.75 3.10 4.90 4.90 7.10 8.90 10.80	.17 .17 .20 .22 .31 .40 .50 .65 1.17 1.45 1.75 2.05 3.35 4.00 7.75 9.70 11.75	.18 .18 .18 .22 .24 .34 .44 .54 .72 1.26 1.58 1.90 2.22 2.3.17 3.60 4.30 5.75 6.50 8.40 10.40 12.70	.19 .19 .19 .22 .33 .44 .57 .1.70 2.40 3.48 3.48 4.66 6.1 7.00 9.00 11.16 113.6

Nipples made to order from Extra Heavy Pipe at double above list.

Nipples larger than 12 inch, made to order and charged as cut pipe, and threads extra



WROUGHT NIPPLES

GALVANIZED.

RIGHT HAND



PLATE D-840 CLOSE NIPPLE



PLATE D-841 LONG NIPPLE

TABLE OF SIZES AND LENGTHS

L	ENG'	тн, Ім	CHES		es	Pri	CES		Ι	RICE	s of]	Extr.	a Lon	g Ni	PPLES		
Close	Short	I	ONG		Size, Inches	se or	guor	Inches 4 5 6 7 8 9 10 11									
					- <u>-</u>	Close	I	4	5	6	7	8	9	10	11	12	
2 1/2 2 3/4 3	2 ½ 2 ½ 2 ½ 3 3 4 4 4 ½ 4 ½ 5	2 2 2 3 3 3 3 3 4 4 4 1/2 5 5 5 5	1/2 3 3 3 1/2/2 3 3 1/2/2 3 3 1/2/2 4 4 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2	4 1/2 4 1/2 4 1/2 5 5 6 6 6 6 1/2	1.8 1.4 3.8 1.4 3.4 1.1 1.4 2.2 1.2 2.2 1.2 3.3 1.2 4.4 1.2 5.5 6.7 7.8	.06 .06 .06 .08 .11 .17 .21 .56 .70 1.20 1.35 2.30 2.80 4.25 5.00	.11 .11 .11 .14 .19 .29 .35 .47 .86 1.10 1.70 1.87 2.60 3.15 4.25 4.95 5.80	.12 .12 .13	.155.15 .155.166 .188.244 .329.52	.17 .17 .17 .18 .21 .28 .38 .46 .61 1.00 1.30	.21 .21 .21 .23 .26 .34 .45 .55 .74 1.26 1.60 2.10 2.30 3.375 4.50 5.65 6.65	.24 .24 .24 .26 .29 .38 .51 .63 .83 1.41 1.80 2.35 2.60 3.65 4.20 6.35 7.50	.26 .26 .28 .32 .42 .57 .70 .93 1.56 2.00 2.60 2.90 4.05 4.05 5.55 7.05 8.35	.29 .29 .29 .31 .35 .47 .63 .77 1.03 1.71 2.20 2.85 3.20 4.45 5.00 6.05 7.75 9.25	.31 .31 .31 .33 .38 .51 .69 .84 1.13 1.86 2.40 3.15 3.50 4.85 5.40 6.60 8.45 10.10	34 34 34 36 41 .55 .75 .91 1.23 2.01 2.60 3.40 3.80 5.25 5.85 7.15 9.20 10.95	



WROUGHT NIPPLES

PLAIN RIGHT AND LEFT

TABLE OF SIZES AND LENGTHS

	LEN	GTH	, In	CHES	3	Inches	Pri	CES		I	PRICES	s of]	Extr	a Lor	NG NI	PPLES	
Close	Short		Lo	NG	-	Size, Inc	Close or Short	Long					Inc	HES			
								I	4	5	6	7	8	9	10	11	12
1 1 1/8 1 3/8 1 1/2 1 5/8	$ \begin{array}{cccc} 1 \frac{1}{2} \\ 1 \frac{1}{2} \\ 2 \\ 2 \frac{1}{2} \\ 2 \frac{1}{2} \end{array} $	2 2 2 2 2 2 1/2 2 1/2 3 3 3 4 1/2 4 1/2	3 3 ½ 3 ½ 3 ½ 3 ½ 4 4		3 ½ 3 ½ 3 ½ 3 ½ 4 ½ 4 ½ 4 ½ 5 5 6	1/8 1/4 3/8 1/2 3/4 1 1/4 1/2 2 2 1/2 3 3 1/2 4	.05 .05 .05 .07 .08 .11 .15 .18 .24 .52 .65 1.00 1.15	.08 .08 .10 .12 .18 .23 .27 .36 .79 .96 1.40	.09	.11 .11 .13 .15 .20 .27 .34 43	.13 .13 .13 .16 .17 .24 .32 .39 .51 .91	$\begin{array}{c} .16 \\ .16 \\ .16 \\ .18 \\ .23 \\ .31 \\ .39 \\ .48 \\ .67 \\ 1.20 \\ 1.44 \\ 1.75 \\ 2.00 \\ \end{array}$.18 .18 .18 .21 .25 .33 .45 .52 .72 1.30 1.60 1.95 2.25	.20 20 .20 .24 .27 .37 .50 .60 .80 1.40 1.77 2.15 2.50	.23 .23 .23 .27 .29 .41 .55 .67 .87 1.55 1.93 2.35 2.75	25 25 25 29 32 45 .60 .72 .96 1.68 2.10 2.55 3.00	27 .27 .27 .31 .35 .48 .65 .80 1.03 1.80 2.27 2.75 3.25

Add 60 per cent, to above prices for Galvanized Right and Left Nipples.

TANK NIPPLES LESS LOCK NUTS NOT OVER 6 INCHES LONG



PLATE 193

SizeInches	1/4	3/8	1/2	3/4	1	11/4	1 1/2	2	$2\frac{1}{2}$	3
Black each Galvanized each	. 50	.50	.55	.65	.70 1.00	. 90	95	1.10	1.50	1.75



WROUGHT COUPLINGS



PLATE 5316

Size Inc	hes	1/8	1/4	3/8	1/2	3/4	1 /	11/4	11/2	2	21/2	3
Black ea Galvanized ea											.40	.60
SizeInches	$3\frac{1}{2}$	4	4 1/2	5	6	7	8	9	10	1 12	1	14
Blackeach Galvanizedeach	.80 1.05	1.00	1.50	$\frac{1.65}{2.25}$	2.40	3.25	4.25	5.50	7.50	10.0	0 18	3.75

EXTRA HEAVY OR HYDRAULIC COUPLINGS

SizeInches	3/8	1/2	3/4	1	11/4	1 1/2	2	21/2	3	3 1/2	4
Plain each Galvanized each	.14	.14	.20 .25	.26	.34	.42	.56	.80 1.05	$\frac{1.20}{1.50}$	1.60 1.90	2.00

LONG SCREWS



PLATE 5317 LONG SCREW WITH SOCKET AND FOLLOWER, FACED

SizeInches	1/4	3/8	1/2	$\frac{3}{4}$	1	11/4	1 1/2	2	21/2	3	3 1/2	4
Standard Length,Inches Blackeach Galvanizedeach	2 1/2	3	3 1/2	4	4 ½	5	51/2	6	7	8	81/2	9

Long Screws, longer than Standard, made to order and charged as Cut Pipe. Threads, Couplings and Lock-Nuts, extra.

Long Screws made to order from extra heavy pipe.



RAILING FITTINGS

FOR FENCES ENCLOSING ENGINES AND MACHINERY, EXHIBITION SPACES, ETC.



PLATE 300 ELBOW



PLATE 301 ELBOW, SIDE OUTLET



PLATE 302 TEE



PLATE 303 TEE, SIDE OUTLET



PLATE 304 CROSS



PLATE 305 CROSS, SIDE OUTLET.



PLATE 306 FLOOR FLANGE, LUG.



PLATE 307 FLOOR FLANGE, SQUARE



PLATE 308 ACORN

MALLEABLE IRON

Size	Inches	1/2	34	1	11/4	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Plate 300, Elbow			.18	.20	.35	.45	.72	1.00	1.50
Plate 301, Side Outlet Elboy			.23	.25	.40	.50	.80		
Plate 302, Tee	each	.20	.23	.25	.40	.50		1.20	1.90
Plate 303, Side Outlet Tee	each	.30	.33	.35	.45	.55		1.40	2.15
Plate 304, Cross				.35		.58	1.00		
Plate 305, Side Outlet Cross					.50			1.75	
Plate 306, Floor Flange, Lu					.24	.30	.42		0.50
Plate 307, Floor Flange, Sq					.40	.50			
Plate 308, Acorn, Screw or I	Driveeach	.16	.18	.20	.25	.35	.90	1.00	1.50

Railing Fittings reducing sizes charged 25 per cent net extra.

GALVANIZED, DOUBLE LIST

FINISHED BRASS RAILING FITTINGS

SizeInches	1/2	3/4	1	11/4	$1\frac{1}{2}$	2
Plate 300, Elboweach	.40	.60	.80	1.20	1.60	2.50
Plate 301, Side Outlet Elboweach	.75	1.00	1.10	1.70	2.00	3.00
Plate 302, Teeeach	.60	.85	1.10	1.70	2.00	3.00
Plate 303, Side Outlet Teeeach	1.05	1.25	1.50	2.00	2.40	3.50
Plate 304, Crosseach	1.05	1.25	1.50	2.00	2.40	3.50
Plate 305, Side Outlet Crosseach	1.20	1.45	1.70	2.25	3.00	4.00
Plate 306, Floor Flange, Lugeach	.26	.35	.40	.70	.95	1.30
Plate 307, Floor Flange, Squareeach	.75	.90	1.00	1.35	1.75	2.50
Plate 308, Acorn, Screw or Driveeach	.75	.90	1.00	1.35	1.75	2.50

Railing Fittings will always be furnished with all openings tapped R, H, unless otherwise specified.

Railing Fittings tapped R. and L. or L. H. will be charged for at 25 per cent. additional net.

Reducing Fittings charged 25 per cent. net extra.



45° ANGLE RAILING FITTINGS



PLATE 309 HAND RAIL ELBOW



PLATE 310 HAND RAIL TEE



PLATE 311 HAND RAIL CROSS



PLATE 312 STAIR LANDING ELBOW



PLATE 313 STAIR LANDING TEE



PLATE 314 STAIR LANDING CROSS



PLATE 315 TEE WITH 45° SIDE OUTLET



PLATE 316 FLANGE ROUND

MALLEABLE IRON

SizeInches	1	11/4	11/2	2	21/2	3
Plate 309, Elbow Hand Rail	.40	.70	.90	1.44	2.00	3.00
Plate 309a, Elbow Hand Rail, Side Outlet	55	.85	1.05	1.75	2.30	3.40
Plate 310, Tee Hand Rail		.80	1.00	1.65	2.40	3.80
Plate 310a, Tee Hand Rail, Side Outlet Plate 311, Cross Hand Rail.	.70	.90	1.10	1.80	2.80	4.30
Plate 311a, Cross Hand Rail, Side Outlet.	.70	1.10	1.16	2.00	3.00	4.50
Plate 312, Elbow, Stair Landing	.40	.70	1.36	$\frac{2.70}{1.50}$	3.50 2.00	5.20
Plate 312a, Elbow, Stair Landing, Side			.50	1.50	2.00	5.00
Outlet	.50	.80	1.00	1.65	2.30	3.40
Plate 313, Tee, Stair Landing. Plate 314, Cross, Stair Landing.	.50	.80	1.00	1.60	2.40	3.80
Plate 315, Tee with 45° Side Outlet	.70 .55	.90 .75	1.10	2.00	3.00	4.50
Plate 316, Flange, Oval or Round	.30	.40	1.00	1.60	$\frac{2.40}{1.00}$	3.80
	.00	.40	.50	.00	1.00	1.50

GALVANIZED DOUBLE LIST

Reducing Fittings charged 25 per cent Net extra

FINISHED BRASS 45° FITTINGS

SizeInches	1	11/4	11/2	2	21/2	3
Elbow, Hand Rail, A Elbow, Hand Rail, Side Outlet Tee with 45° Side Outlet, G	1.50 1.55 1.60	1.70 2.05 2.20	2.15 2.40 2.60	3.00 3.35 3.40	8.00	14,00

Reducing Fittings charged 25% net extra.



ADJUSTABLE RAILING FITTINGS



PLATE 317 ELBOW



PLATE 318 TEE



PLATE 319 CROSS



PLATE 320 STAIR TEE



PLATE 321 STAIR CROSS



PLATE 322 STAIR LANDING TEE



PLATE 323 STAIR LANDING CROSS



PLATE 324 FLANGE

MALLEABLE IRON RAILING FITTINGS-ADJUSTABLE

Size	1	11/4	1½	2
Plate 317 Elbows	1.65 1.30 1.85 1.50 2.05 1.30 1.50 .90 1.00	1.25 1.85 1.50 2.10 1.75 2.45 1.60 1.85 1.10 1.20 1.75	1.70 2.55 2.00 2.85 2.35 3.35 2.15 2.50 1.50 1.60	2.25 3 35 2.50 3.60 2.75 3.85 2.50 2.75 2.15 2.40

For Galvanized, double above List.

FINISHED BRASS RAILING FITTINGS-ADJUSTABLE

Size	Inches	1	11/4	1½	2
Plate 317 Plate 318 Plate 319 Plate 320 Plate 321	Elbows each Tees each Crosses each Stair Tees each Stair Crosses each	$3.25 \\ 3.75 \\ 3.25$	3.15 3.75 4.40 4.00 4.65	4.25 5.00 5.90 5.40 6.25	5.65 6.25 6.90 6.25 6.90

By means of these Fittings, almost any angle may be obtained in railings for stairs and other places requiring deviation from horizontal or perpendicular lines, which would otherwise require special patterns to attain the same results. Right and left, and left hand fittings, 25 per cent. extra.

RAILING FITTINGS

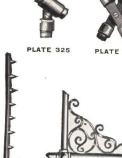






PLATE 328



PLATE 329



PLATE 330 PLATE 331



PLATE 332



PLATE 333



PLATE 334



PLATE 335



PLATE 336



PLATE 337



PLATE 338 PLATE 339



PLATE 340

SizeInches	1/2	34	1	11/4	1 1/2	2	21/2	3
Plate 325, Stair Rail Tees, Adi		45	65	1 00	1 15			
rate 321, france Ran Engs, drive into bibe	2 2 2 2	The series and		40	50	.75		
riate 328, Rosette Plates	2 2 2 2	0000	18	20	30	.40		
Plate 329, Plain Ceiling or Wall Plates Plate 330, Loafer Cushions, 18 in long	.11	.13	.16	.18	.23	.27	.36	. 5
Plate 331, Scroll Orna., drilled for screws.	***	5 5 505	.50	.50	.30	.30		
Plate 332, Gate Centre Pieces (only)			1.00	1.50				. 5
rate 333, Self-Closing Gate Latches	V 40 4030		.70	.80	.90	1.00	2000	
Tate 334, Plug Hinges	.35	.40	.45	. 55	. 80	1.00		
rate 335, Foot Rail Brackets, Black	.70	. 80	1.00	1.10	1.30	1.50		
Plate 336, Foot Rail Brackets, Black	.60	.70	.90	1.00	1.20	1.40		
Plate 337, Foot Rail Brackets, Black			11					
Plate 338, Foot Rail Brackets, Black Plate 339, End for Foot Rail, drives in pipe	.15	1.5	20	25	30	40		
Plate 340, Stair Rail Ends, drive in fitting.			.80	1.00	1.75	2.00		

PLAIN PATTERN RAILING FITTINGS MALLEABLE IRON





PLATE 342 BOARD WALK FLANGE



BOARD WALK BRACKET
Furnished either Threaded or to Slip



PLATE 341

PLATE 344

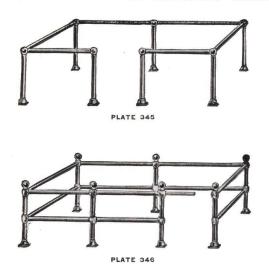
The above illustration shows a section of Board Walk Railing, all posts except the end ones are furnished with fittings reamed on run to allow the horizontal lines of pipe to pass through.

We carry a full line of these fittings in stock for Board Walks, Bridge Railings, Tank Towers, etc.



RAILING FITTINGS

TWO POPULAR STYLES OF EXHIBITION RAILINGS



We are prepared to furnish Railings for all purposes either with Railing Pattern, Flush Joint, or Adjustable Fittings of Malleable Iron or Polished Brass, all Fittings being counterbored, so that when Pipe is screwed up no threads are visible.

We also manufacture a special line of Cast Iron Railing Fittings, Plain or Ball Pattern, to suit any angle or grade.

Inquiries and orders should be accompanied by sketches showing clearly which openings are to be reamed for slip joints and those to be screwed, and whether right-hand or left-hand threads are wanted, otherwise we will furnish all fittings tapped right-hand.

To avoid errors kindly specify fittings by both name and our figure numbers.

Where sketches or blue prints are submitted showing arrangement of Railing desired, we shall be pleased to quote prices on same ready for erection.



CLIMAX STEAM JOINT CLAMP



PLATE 5028 NO. 1



PLATE 5029 NO. 2

CLAMP FOR

Pipe Inches	3/4	1	11/4	1½	2	21/2	3	31/2	4	$4\frac{1}{2}$	5
Price each	1.50	1.50	1.90	2.25	3.00	3.75	4.50	5.25	6.00	6.75	7.50
Pipe Inches	6	7	8	9	10	12	14	15	16	18	20
Price each	9.00	10.50	13.00	15.75	18 75	22 50	31 50	33 75	36.00	40 50	45 00

The Clamps are made in halves, held together by Cap Screws.

EMERGENCY PIPE CLAMP

FOR REPAIRING LEAKS AND SPLITS IN PIPE

MADE OF MALLEABLE IRON

COMPLETE WITH PACKING READY FOR USE



PLATE 5030



PLATE 5031

Size of PipeInches	$\frac{1}{2}$	3/4	1	11/4	1½	2	21/2	3	31/2	4
Length over all	31/4	31/4	3½	3¾	4	41/4	41/2	5	51/2	6
Weight, per Doz., Bxd, Lbs	11	13	16	19	24	33	39	53	60	76
Price each	.40	.45	. 50	. 60	.70	.80	1.00	1.25	1.50	2.00



BEATON'S FLOOR AND CEILING PLATES



PLATE 5465



PLATE 5466

SizeInches	1/8	1/4	3/8	1/2	3/4	1	11/4	1½	2	21/2
Black N. P. Cast Brass.	.14 .25 1.00	.25	.15 .26 1.00	.27	.28	.32	.35	.38	.45	.50 .65 2.50
SizeInches	3	31/2	4	$4\frac{1}{2}$	5	6	7	8	10	
Black	.80	1.00	1.25	1.50	1.75	2.00	2.25	2.25 2.50 12.00	3 00	

TELESCOPING FIRE PROOF FLOOR SLEEVES

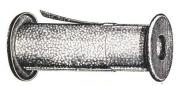


PLATE 5467

Galvanized Sheet Iron with neat, heavy Steel Flange on top and bottom.

No. 1 TELESCOPE, 12 TO 17 INCHES

Size Inches	3/4	1	11/4
Each	1.00	1.10	1.30

No. 2 TELESCOPE, 14 TO 24 INCHES

Size Inches	3/4	1	11/4	1 1/2	2	21/2	3	3 1/2	4	5	6	8
Each	1.05	1.20	1.35	1.50	1.80	2.10	2.50	3.00	3.75	4 50	5 25	6 75



SEAMLESS BRASS AND COPPER TUBING



PLATE 6815

STUBS' GAUGE THE STANDARD-Extras Over Base Price

Outside Diameter

Stubs' Gauge	Decimals of an in.	3/8	7 16	1/2	9 16	5/8	3/4	7/8	1	1 1/4	1 1/2	1 3/4	2	21/4	$2\frac{1}{2}$	2 3/4	3	3 1/4	3 1/2
4-11 12 13	.238120 .109 .095					.06 .07	.05 .05		.05 .05				В	ase I	Price	9			•
14	.083				.07	.07	.05	.05	.05		.01			.01					
15	.072		.08		.07	.07	.05		.05				.01		.01		.01		
16	.065	.08		$07 \\ 07$	$.07 \\ .07$.07	.05		.05				.02			.02			
17	.058	.08			.08		.06		.06							.04			
18	.049	.09			.08		.06		.06								.08		
19	.042	.09	.09		.08				.06							.07	.08		
20	.035		.10		.08	.08	.07		.07				.07		.01		.00	. 0.	
$\frac{21}{22}$.032	.11	.13	.11	.11	.09		.08											
23	.025	.15	.15		.13	.11	.11				1.11		.13	.15					
$\frac{23}{24}$.023	.31			.23	.22	.21					.19							
25	.020	.34	.29	.27	.25	.24	.23	.22	.22	.2	3 .24								
Stubs				-	_		,	_	1	1	_	1	1	_	1	1		1	
Gauge			3 3/4		4	41/	٨.	1 1/2	43	1	5	5	1/4	51/2	5	3/4	6		61/4
Gauge	or an i	ittii	0 74	_	*	474		1/2	1	4		-	_	_	-		-	- -	_
4-11	.2381	20	.01		01	.01		.03	.0		.05)5	.06		06	.07		.07
12	.109		.02		02	. 02		.04	.0		.06)6	.07		07	.08		.08
13	.095		.03		03	.08		.05	.0		.07)7	.08		08	.09		.09
14	.083		.04		04	.04		.06	.0		.08		8	.09		09	.10		$.10 \\ .14$
15	.072		.06		06	.07		.07	.0		.09		9	.11		11	.14		.19
16	.065		.06		07	.08		.11	.1		.11		6	.16		16 17	.20		.20
17.	.058		.07		08	. 09		.12	.1		.12		17	.17 $.20$		20	.28		.23
18	.049		.09		10	.11		.14	.1		.14		20	.29		31	.31		
19	.042		.11		13	.15		.17	.2		.23	1 .2		.31	1 2	-			
20	.035		.11	1 .	13	.19	, 1	.19	1 .4	0 1	.40	1 .0)T !	.01	1.	• • •			•••
Stubs				1						. 1		1	. 1	01/	1	9	91		10
Gauge	e of an ir	ich	$6\frac{1}{2}$	6	3/4	7	1	71/4	71	2	$7\frac{3}{4}$	8		8 1/2		9	97	2	10
4-11	.2381	20	.07		07	.07	,	.09	.0	9	.09	.1	1	.11		11	.14	1	.17
12	.109		.08		08	.08		10	1		.10	1 .1		.12		12	.15		.18
13	.095		.09		09	.00		11	1		.11	1.1		.13	1.	13	.16	3	.19
14	.083		.10		10	.10		12	1		.12	.1		.14	1.	14		.	
15	.072		.14		16	.16		19	.1		.19								
16	.065		.23		23	.28		26	.2	6	.26				1 .			.	
17	.058		.24	1 .:	24	.24		27	.2		.27		- 1		1.				
18	.049		.30		30	.30	1						. 1		1			- 1	

SEAMLESS BRASS AND COPPER TUBING

(CONTINUED)

IRON PIPE SIZES-Extras Over Base Prices

Iron pipe sizeInches	1/8	1/4	3/8	1/2	3/4	1	11/4	$1\frac{1}{2}$	2
Approx. weight, per footlbs. Per pound	.25	.43	.62	.90	1.25	1.70 B	2.50 ase Pr		4
Iron pipe sizeInches	$2\frac{1}{2}$	3	3 1/2	4	4 1/2	5	6	7	8
Approx. weight, per footlbs. Per pound	5.75 Base	8.30 Price	10.90	12.70	13.90	15.75 .06	18.31	23.74	29.86

Copper, Bronze or Gilding Tubing, 3 cents per pound advance over Brass Tubing

CUTTING BRASS TUBING-Additional to Lists

LengthInches	up to 24	Over 9 up to 12 Inclus.	up to 9	up to 6	up to 4	up to 2	up to 1
Per pound	.01	.01 1/2	.02	. 02 1/2	. 03	. 03 ½	.04

CONDENSER TUBES

Net Extras over Base Price Brass Tubes, Cents per Pound

Stubs'			BRA	SS			ADMI	RALTY	
Gauge		5/8 in.	3/4 in.	₹ in.	1 in.	5/8 in.	3/4 in.	⁷ / ₈ in.	1 in.
16	.065	4	4	4	4	5 1/2	51/2	51/2	51/2
17	.058	4	4	4	4	51/2	5 1/2	5 1/2	5 1/2
18	.049	4	4	4	4	5 1/2	516	5 1/2	5 1/2
19	.042	6	6	6	6	71/2	71/2	71/6	71/0
20	.035	8	6	6	6	91/2	71/6	71%	712

FOR TINNING CONDENSER TUBES INSIDE AND OUTSIDE, TWO CENTS
PER POUND ADVANCE



SEAMLESS BRASS PIPE

IRON PIPE SIZES—REGULAR AND EXTRA HEAVY ALSO TABLE SHOWING ACTUAL SIZES AND APPROXIMATE WEIGHT PER FOOT

PRICE LIST

	Price per Lb.		REGULA	п Тніскі	NESS		EXTRA	HEAVY	
Iron Pipe Size	in Cents Ad- vance on Base Price	Out- side Diam- eter	In- side Diam- eter	Thick- ness	Weight per Foot	Out- side Diam- eter	In- side Diam- eter	Thick- ness	Weight per Foot
1/8 1/4 3/4 3/4 1 1/4 1/2 2 1/2 3 1/2 4	8 7 2 1 Base Base Base Base Base Base	Ins405 .540 .675 .840 1.050 1.315 1.660 1.900 2.375 2.875 3.500 4.000 4.500 5.000	Ins281 .375 .484 .625 .822 1.062 1.368 1.600 2.062 2.500 3.062 3.500 4.000 4.500	Ins064 .083 .096 .107 .114 .126 .146 .150 .157 .188 .219 .250 .250 .250	Lbs25 .43 .62 .90 1.25 1.70 2.50 3.00 4.00 5.75 8.30 10.90 12.70 13.90	Ins405 .540 .675 .840 1.050 1.315 1.660 1.900 2.375 2.875 3.500 4.000 4.500 5.000	Ins205 .294 .421 .542 .736 .951 1.272 1.494 1.933 2.315 2.892 3.358 3.818 4.250	Ins100 .123 .127 .149 .157 .182 .194 .203 .221 .280 .304 .321 .341 .375	Lbs370 .625 .830 1,200 1.660 2.360 3.300 4.250 5.460 8.300 11.200 13.700 16.500 19.470
$\frac{4}{5}$ $\frac{1}{2}$ $\frac{5}{6}$	$\begin{bmatrix} 2\\4\\6\\7 \end{bmatrix}$	5.563	5.062 6.125	.250	15.75 18.31	5.563 6.625	4.813 5.750	.375 .437	22.800 32.000

Stock lengths are all 12 feet.

SEAMLESS COPPER AND BRONZE PIPE

IRON PIPE SIZES-REGULAR AND EXTRA HEAVY ALSO TABLE SHOWING APPROXIMATE WEIGHTS PER FOOT

PRICE LIST

Iron Pipe SizeInches	1/8	1/4	3/8	1/2	3/4	1	11/4	$1\frac{1}{2}$	2	$2\frac{1}{2}$
Price per pound in cents advance on base prices.	8	7	2	1	Base	Base	Base	Base	Base	Base
Approximate Weight per lineal foot Regular Thickness		.450	.650	.950	1.310	1.790	2.630	3.150	4.200	6.040
Approximate Weight per lineal foot Extra Heavy.	.389	.651	.872	1.260	1.743	2.478	3.465	4.462	5.733	8.715

Diameters and thickness Regular and Extra Heavy Copper Pipe, same as corresponding sizes of Regular and Extra Heavy Brass Pipe.

Stock lengths are all 12 feet

BRASS FITTINGS. MALLEABLE PATTERN



PLATE 388 ELBOW



PLATE 389



PLATE 390 CROSS



PLATE 391 RETURN BEND.



PLATE 392 DROP ELBOW



PLATE 393 DROP TEE



PLATE 394 STREET ELBOW.



PLATE 395 RIGHT HAND COUPLING.



PLATE 396
RIGHT AND LEFT HAND COUPLING.



PLATE 397 CAP.



PLUG.



PLATE 399 LOCK NUT.



PLATE 400 BUSHING.

Price List on following pages.



BRASS FITTINGS

ROUGH

IRON PIPE THREAD

MALLEABLE PATTERN

SizeInches	1/8	1/4	3/8	1/2	3/4	1	11/4	11/2	2	21/2	3	3½	4
Elbows Elbows, Reducing. Elbows, 45°		.19	.25	. 28 . 35 . 31	. 40 . 50 . 40	. 63 . 80 . 63	1.10	1.50	2.00 2.50 2.00	3.50 4.25 3.50	7.50	8.00 10.00 8.00	12.50
Elbows, Street Elbows, SideOutlet Elbows, Drop, Fem	. 25	.45	.33 .60 .35	.48 .85 .45	.63 1.20 .65	1.90	2.75	3.60	3.25 6.00 3.40	10.50	10.00 18.00		
Tees	. 17	. 21 . 25	.28 .35	.40 .50	. 55 . 70	.85 1.05	$1.25 \\ 1.55$	$\frac{1.70}{2.10}$	$\frac{2.80}{3.50}$		$8.50 \\ 10.50$		
Tees, Drop, S'le Ear Tees Drop, D'le Ear Tees, Side Outlet			.43 .58	.74	1.05	1.70	2.45	13.30	4.20 5.60 8.50				
Crosses, Reducing.			.40		.80 1.00	1.25 1.55	$\frac{1.80}{2.25}$	$\frac{2.40}{3.00}$	4.00 5.00		$12.00 \\ 15.00$		
Couplings, R.&L. Couplings, Red'c'g	. 13	.13 .17 .15	.17 .22 .20		.45	.70	1.00	1.30	$1.60 \\ 2.00 \\ 1.75$	3.10	4.50		
Bushings, Regular Bushings, Faced		.10	.12	.15		.35	. 50		$\frac{1.00}{1.25}$				
Plugs, Regular Plugs, Solid Plugs, Counters'nk			. 18		.20 .30 .30	.45	.80	1.20	$\begin{array}{c} .95 \\ 1.90 \\ 1.40 \end{array}$	3.00	4.50	7.50	5.00 10.00 7.50
Caps Locknuts	.10	. 13 . 10	.16	.20			.60		1.25				
Ret. Bends, Close. Ret. Bends, Open. Y Branches				.80	1.10	1.40	2.15	3.00	$\begin{array}{c} 4.25 \\ 4.75 \\ 5.50 \end{array}$	8.25	10.00 11.00 16.00		

NOTE.—Right and Left Elbows, reducing more than two sizes, add 25 per cent to

above lists. Elbows Tapped Right and Left Hand, add 25 per cent. to above lists. Elbows Tapped Right and Left Hand, and 25 per cent. to above lists. Tees reducing more than two sizes, add 25 per cent. to above lists. Crosses reducing more than two sizes, add 25 per cent. to above lists. Reducers, Bushings and Faced Bushings, reducing more than two sizes, add 25 per cent. to above lists

For Right and Left Hand Return Bends, add 25 per cent. to above lists.



BRASS FITTINGS

NICKEL PLATED

IRON PIPE SIZE MALLEABLE PATTERN

FOR STEAM WORKING PRESSURES UP TO 125 POUNDS

Elbows, 90°ea. Elbows, Reducingea. Elbows, 45°ea. Elbows, Streetea. Elbows, Drop Fe-	.45	. 52	.65		.87	_	-	2 25	-	2 1/2	3	3 1/2	4
Elbows, Reduc- ing ea. Elbows, 45° ea. Elbows, Street ea.	.45	. 52	.65		.87	1.25	75						
Elbows, 45°ea. Elbows, Streetea.	.45	. 53	.65	00			2	4.40	3.35	6.15	10.00	16.00	20.00
Elbows, Street ea.	.45	. 53			1.10	1.60	2.15	2.85	4.15	7 60	12 50	20.00	95 00
Elbows, Street ea.	. 54			.78	1.00	1.43	1.95	2 55	3 65		11 00	18.00	20.00
		. 60	.73	.95	1.23	1.65	2.55	3.35	4.90		15 00		44.00
					1		1			0.00	10.00		
maleea.			1.00	1.25	1.65	2.30	3.20	4.10	6.00				
Outletea. Teesea.		1.25	1.60	2.00	2.60	3.75	5.35	6.80	10 00	18 50	30 00		
Tees, Reducing, ea.	. 50	. 58	.75	.93	1.22	1.70	2.45	3.15	4 65	8 65	14 00	20 20	00 00
Tees, Reducingea. Tees, Drop.		.72	. 90	1.15	1.50	2.10	3.00	3.95	5.85	10 90	17.50	29 00	25.00
Tees, Drop,				i.					0.00	10.00	11.00	40.00	35.00
Double Earea. Tees, Drop,			1.48	1.80	2.40	3.40	4.85	6.25	9 30				
Tees, Drop,									0.00				
Single Earea.			1.33	1.62	2.15	2.95	4.25	5.45	7 90				
Crossesea.	.72	.84	1.05	1.30	1.75	2.50	3.50	4 50	6 70	19 30	20 00	32.00	
Crosses, neducea.		1.05	1.30	1.65	2.15	3.15	4.35	5 70	8 30	15 40	25 00	40.00	10.00
busningsea.		.26	.32	.42	. 55	.82	1.15	1 65		3 50	5 15	7.10	00.00
Plugsea.	.28	.37	.45	.52	. 67	90	1 20	1 55	2 20				
Solid Plugsea.			.51	.59	.77	1.05	55	2 15	2 25	5.00	7 15	10.851	9.00
Countersunk								1.10	0.40	3.00	1.15	10.85	4.00
Plugsea.				.49	63	.92	1 30	1 75	9 55		1	- 1	
apsea.	.23	.29	.36	.47	. 63	89	1.25	1 75		1 50	6 15		: : : :
lock-nutsea.	.29	.30	.39	.48	.60	77	1.00	1 20	1.85	9.75	0.15	8.851	1.00
ouplingsea.	.29	.33	.42	.53		1.00	15	1 80	2.60	4. 50	0.40	7.35	9.00
Couplings, R.							. 10	1.00	4.00	4.50	6.50	11.251	4.25
and Lea.	.37	.44	. 55	. 67	92	201	85	95	9 95	F 77	0 50		
Couplings, Reduc.ea.		.42	.53	.65	87	.20	75	15	$\frac{3.35}{3.10}$	0.75	8.50		
Return Bends.					- 1				5.10	5.40	8.00	14.001	8.00
Close ea.		1	. 55 1	85	40	10/	10	70	0 051	- 000	0 00	- 1	
									0.251	5.002	2.00		
Open ea. Bends ea.			60 1	959	509	25/	750	20	0 771	0 000	0 00	- 1	
Bendsea.		1	60 1	905	503	505	100	.40	0.751	0.252	3.00 .	2122	

NOTE.—Right and Left Elbows, reducing more than two sizes, add 25 per cent to

-Right and Lett Elbows, reducing more than two sizes, and 25 per cent. to above lists.

Elbows Tapped Right and Left Hand, add 25 per cent. to above lists.

Tees reducing more than two sizes, add 25 per cent. to above lists.

Crosses reducing more than two sizes, add 25 per cent. to above lists.

Reducers, Bushings and Faced Bushings, reducing more than two sizes, add

25 per cent. to above lists.
For Right and Left Hand Return Bends, add 25 per cent. to above lists.

BRASS PIPE NIPPLES

IRON PIPE SIZE



PLATE 3853

Size					Li	ENGTH,	INCH	ES			_
J.	Close	1½	2	21/2	3	3 ½	4	4 1/2	5	51/2	6
½each	.11	.13	.15	.17	.19	.21	.23	.25	.27	.29	.3
½each 3/8each	.13	.16	.19	.22	.25	.28	.31	.34	.37 .47	.40	.4
½each	.23	.25	.30	.35	.40	.45	.50	.55	.60	.65	.7
³ / ₄ each	.28		.35	.42	.49	.56	.63	.70	.77	.84	.9
each	.37		.44	.53	.62	.71	.80	.89	.98	1.07	1.1
1/4each 1/2each	.60 .70			.75 .90	.88 1.05	$\frac{1.01}{1.20}$	1.14	$\frac{1.27}{1.50}$	$\frac{1.40}{1.65}$	1.53 1.80	1.6
each	1.00			1.20	1.40	1.60	1.80	2.00	2.20	2.40	2.6
½ each	1.70				2.00	2.30	2.60	2.90	3.20	3.50	3.8
each	2.50				2.90	3.30	3.70	4.10	4.50	4.90	5.3
½each	4.00						5.40	6.00	6.60	7.20	7.8
each	4.75						6.15	6.85	7.55	8.25	8.9
½ each	5.50			1. 19 18 18 18		22 22 21	7.20	8.05	8.90	$9.75 \\ 12.70$	10.6 13.7
each	$8.50 \\ 11.50$			10000 10 00 10				$10.60 \\ 14.10$	$11.65 \\ 15.40$	16.70	18.0

Polished Brass Nipples, Longer than Close, 25% Extra.



STANDARD

PLATE 3854

BRASS UNIONS GROUND JOINTS

STANDARD FOR 125 POUNDS WORKING PRESSURE

STANDARD BRASS UNIONS



PLATE 3855

SizeInches	1/8	1/4	3/8	1/2	3/4	1	11/4	1 1/2	2	$2\frac{1}{2}$	3	3 1/2	4
RoughEach	.40	. 50	. 65	.85	1.15	1.60	2.25	2.70	4.00	7.50	11.50	20.00	27.00
Semi-FinishedEach	.45	. 55	.75	.95	1.30	1.75	2.50	3.00	4.50	8.25	12.75	22.50	30.00
Finished Each	. 50	. 60	.85	1.05	1.40	1.90	2.75	3.25	5.00	9.00	14.00	25.00	33.00
Nickel Plated Each	. 60	.72	1.02	1.26	1.68	2.28	3.30	3.90	6.00	10.80	16.80	30.00	39.60

"OCTA"	BRASS	UNIONS
--------	-------	--------

Size Inches	1/8	1/4	3/8	1/2	3/4	1	11/4	1 1/2	2	$2\frac{1}{2}$	3	3 1/2	4
Rough Each Finished Each Nickel Plated Each	.85	.90	1.15	1.45	1.90	2.50	3.35	4.25	6.00	10.00	16.00	25.00	33.00



EXTRA HEAVY BRASS FITTINGS FOR 250 POUNDS WORKING PRESSURE CAST IRON PATTERN - ROUGH FOR IRON PIPE











PLATE 403 CROSS

SizeInches	1/4	3/8	1/2	3/4	1	11/4	11/2	2	2 ½	3	3 ½	4
Elbowseach		.45		1.00						11.25		
Elbows, 45°each Elbows, Reducing.each		.55		$\frac{1.10}{1.20}$				$\frac{4.50}{5.25}$		$\frac{11.25}{13.00}$		
Elbows, R. and L. each	.40	.55	.75	1.20	1.80	2.60	3.50	5.25	9.00	13.00		
Tees. Reducing each		.60		$\frac{1.35}{1.55}$						$\frac{15.00}{17.00}$		
Crosseseach				2.00				9.00	16,00	22,50	28,00	37.00
Crosses, Reducing each Ret. Bends, Close. each		1.10	$\frac{1.50}{1.65}$	$\frac{2.40}{2.50}$	3.50	$\frac{5.25}{5.00}$	7.00	10.50 10.00	$18.00 \\ 16.00$	$\frac{26.00}{22.00}$	32.00 30.00	$\frac{42.00}{40.00}$
Ret. Bends, Open. each Couplings each			1.80	2.75	4.00	5.50	8.00	11,00	18.00	25.00	35,00	45.00
Y Brancheseach	.90	1.10	1.50	2.50	3.50	5.50	7.25	11.00	19.00	27.00	33.00	45.00
	,						(

Caps and Locknuts furnished from Cast Iron Patterns when desired. We can furnish from this pattern any reducing sizes of Brass Fittings that are made in cast iron, at special prices.

Brass Flange Unions, Rough



PLATE 404 STANDARD FOR 125 LBS. WORKING STEAM PRESSURE.



PLATE 405 EXTRA HEAVY FOR 250 LBS. WORKING STEAM PRESSURE

BRASS STANDARD FLANGE UNIONS

Size. Inches	1/2	3/4	1	11/4	$1\frac{1}{2}$	2	2 1/2	3	$3\frac{1}{2}$	4	4 1/2	5	6
Price each	4.00	4.50	5.00	5.50	7.00	9.00	11.50	15.00	18.00	22.00	27.00	35.00	45.00

	BF	RASS	S EX	TRA	HEA	VY	FLAN	GE L	INIO	NS		
SizeInches	3/4	1	11/4	1 1/2	2	$2\frac{1}{2}$	3	3 1/2	4	$4\frac{1}{2}$	5	6
Priceeach	7.50	8.50	11.00	13.00	16 00	18 00	24 00	27 00	30.00	37.00	48.00	60.00

Furnished with Iron Bolts unless otherwise ordered.



PLATE 102



PLATE 103 60⁰ ELBOW



PLATE 104 45⁰ ELBOW



PLATE 105 22 1-2⁰ ELBOW



PLATE 106 11 1-4⁰ ELBOW



PLATE 107 5 5-8⁰ ELBOW



PLATE 108 90⁰ LONG TURN ELBOW

_ X - L - L - L - L - L



PLATE 109 45⁰ LONG TURN ELBOW

BLACK

SizeInches	11/4	1 1/2	2	21/2	3	4	5	6	7	8	10	12
90° ElbowEa.	.30	.38	.57	1.20	1.45	2.30	4.25	6.25	11.50	15.00	31.00	47.50
60° Elbow Ea.	.30	.38	.57	1.20	1.45	2.30	4.25	6.25	11.50	15.00	31.00	
45° Elbow Ea.	.30	.38	.57	1.20	1.45	2.30	4.25	6.25	11.50	15.00	31.00	
22 1/2° Elbow Ea.	.30	.38	.57	1.20	1.45	2.30	4.25	6.25	11.50	15.00	31.00	
11 4° Elbow Ea.	.30	.38	.57	1.20	1.45	2.30	4.25	6.25	11.50	15.00	31.00	
5 5% Elbow Ea.												
90° L'g T'n Elb Ea.												
45° L'g T'n Elb. Ea.												

GALVANIZED

SizeInches	11/4	$1\frac{1}{2}$	2	21/2	3	4	5	6	7	8	10	12
90° ElbowEa.	.52	.67	1.00	2.10	2.55	4.00	7.40	11.00	20.00	26.25	54.00	83.0
60° ElbowEa.												
45° Elbow Ea.												
22 1/2° Elbow . Ea.												
11 4° Elbow . Ea.												
5 5% Elbow . Ea.	.52	.67	1.00	2.10	2.55	4.00	7.40	11.00	20.00	26.25	54.00	
90° L. T. Elb . Ea.	.60	.72	1.15	2.45	3.10	4.80	9.20	13.15	23.50	33.25	66.50	100.0
45° L. T. Elb. Ea.		.72	1.15	2.45	3.10	4.80	9.20	13.15	23.50	33.25	66.50	





PLATE 110 90⁰ ELBOW, WITH SIDE OUTLET



PLATE 111 90⁰ ELBOW, WITH HEEL OUTLET



PLATE 112 3-WAY ELBOW



PLATE 113
REDUCING CLOSET ELBOW



PLATE 114 CLOSET FLANGE, IRON



PLATE 115 CLOSET FLANGE, BRASS

BLACK

SizeInches	$1\frac{1}{2}$	2	3	4	5	6
90° Elbow with Side OutletEach				3.85		
90° Elbow with Heel OutletEach				3.85		
Three-way Elbow Each	85	1 10	3 00		7.50	
Reducing Three-Way Elbow Each				5.50	8.25	
Closet Elbows Each				4 25	10000000000000000000000000000000000000	
Reducing Closet ElbowsEach					4 95	
raithion Crosses, ReducingEach	1.25		200000	44.44		
Closet Flanges				1 25		
Drass Closet Flanges Each				7.00		
Cast from Closet Flanges with Recess I						
for Asbestos Ring PackingEach				1.35		

GALVANIZED

SizeInches	$1\frac{1}{2}$	2	3	4	5	6
90° Elbow with Side Outlet. Each 90° Elbow with Heel Outlet. Each			the second on an area	6 75	1	
Three-Way Elbow Each	1 50	1 05	5 25	8 75	12 15	99 50
Reducing Three-Way ElbowEach Closet ElbowEach				0 65	14 50	96 95
Reducing Closet Elbows Each					7 40	
Farmion Crosses, Reducing Each	() ()()					
Closet Flanges. Each Cast Iron Closet Flanges with Recess						
for Asbestos Ring Packing Each				2.35		





PLATE 116 TEE



PLATE 117 BASIN TEE



PLATE 118 BASIN CROSS

BLACK

SizeInches	$1\frac{1}{2}$	2	3	4	5	6	7	8	10
TeesEach	. 55	.80	2.00	3.25	6.00	8.75	16.00	21.00	43.00
Reducing Toos Each		00	9 90	2 60	6 60				
Basin Tees Bach	711	1 (1)	FT. 00 TO TO TO TO		the or or or or		the second or only	the second or sold	
Reducing Basin Lees Bach		2(1	HOMOGOGOTACUT		10 0 H H H W				
Basin CrossesEach		1.75		2222			1 3 1		
Reducing Basin CrossesEach		1.95							

GALVANIZED

SizeInches	1 1	2	2		3		4			5			6			7	7		8	3		1	0
TeesEach	1.0	00	1.40	3	50	5	.7	0	10).	50	15	5.	25	2	8	.00	3	7.	00	7	5	.00
Reducing TeesEach			1.60	3	.85	6	.3	0	11	1.	55				10	200							
Basin Tees Each	1 9	,,,	1 05												1			1			1		
Reducing Basin Tees Each	0 2 5	10	2 10	0.0		100		100										1.					
Basin Crosses Each			3 10	0.0				- 1							4						1		
Reducing Basin CrossesEach			3.40										ž.		1.						1.		

TUCKER CONNECTIONS



PLATE 118A

Size	2	21/2	3	4	6	8	10
Black	.80	$\frac{1.50}{2.45}$	2.00	3.25 5.70	8.75 15.25	21.00 37.00	43.00 75.00





PLATE 119 90⁰ Y BRANCH TEE PATTERN



PLATE 120 DOUBLE 90⁰ Y BRANCH TEE PATTERN. (CROSS)

BLACK

Size	14 11	2 2	21/2	3	4
90° Y Branches, Tee Pattern	45	57 .8	35 1.80	2 20	3.50
Reducing 90° Y Branches, Tee Patterneach			5 2.00		
90° Long Turn Y Branches, Tee Patterneach .:	57 .7	0 1.1	0 2.40	3.35	6.00
Reducing 90° Long Turn Y Branches, Tee Pattern each	.8	1.2	0 2.65	3.75	6.60
Double 90° Y Branches, Tee Patterneach .7	70 8	1.3	0 2.85	3.40	5.25
Double Reducing 90° Y Branches, Tee Patterneach		. 1.5	0 3.15	3.75	5.75
Double 90° Long Turn Y Branches, Tee Pattern each	1.1	0 1.7	5 3.60	5.00	9.00
Double Reducing 90° Long Turn Y Br., Tee Pat.each		. 1.9	0	5.50	10.00
SizeInches	5	6	7	8	10
90° Y Branches, Tee Patterneach	6.50	0.50	17.50	22.00	47.00
	7.15				
90° Long Turn Y Branches, Tee Patterneach	9.50	20.00	30.00	40.00	
Reducing 90° Long Turn Y Branches, Tee Pattern.each 1	10.50	22.00	33.00	44.00	
Double 90° Y Branches, Tee Patterneach	9.50	4 00	00.00	11.00	
Double Reducing 90° Y Branches, Tee Patterneach 1	10.50	15.50			
Double 90° Long Turn Y Branches, Tee Pattern. each 1	14 00 3	80.00	45.00	60.00	

GALVANIZED

SizeInches	11/4	$1\frac{1}{2}$	2	21/2	3	4
90° Y Branches, Tee Patterneach	.80	1.00	1.50	3.13	3.85	6.15
Reducing 90° Y Branches, Tee Patterneach		1.10	1.65	3.50	4.20	6.75
90° Long Turn Y Branches, Tee Patterneach	1.00	1.22	1.95	4.20	5.85	10.50
Reducing 90° Long Turn Y Branches, Tee Pat each		1.40	2.10	4.6	6.55	11.55
Double 90° Y Branches, Tee Patterneach	1.22	1.50	2.30	5.00	5.95	9.20
Double Reducing 90° Y Branches, Tee Patterneach			2.60	5.50	6.55	10.00
Double 90° Long Turn Y Branches, Tee Pattern.each		1.95	3.10	6.30	8.75	15.75
Double Reducing 90° Long Turn Y Br., Tee Pat.each			3.35		9.65	17.50
SizeInches	5	6		7	8	10
90° Y Branches, Tee Patterneach	11.3.	5 16.5	50 30	0.50	40.00	82.00
Reducing 90° Y Branches, Tee Patterneach	12.50	0 18.5	0 33	3.25	44.50	
90° Long Turn Y Branches, Tee Patterneach	16.50	35.0	0 52	2.50	70.00	
Reducing 90° Long Turn Y Branches, Tee Pateach	18.50	38.5	0 58	3.00		
Double 90° Y Branches, Tee Patterneach	16.50	24.5	0			
Double Reducing 90° Y Branches, Tee Patterneach	18.50	0 27.0	0			
Double 90° Long Turn Y Branches, Tee Pattern.each	24.50	52.5	0 79	00.6	105.00	
Double Reducing 90 Long Turn Y Br., Tee Pat.each	27.00	0 58.0	0			



PLATE 121 45⁰ Y BRANCH



PLATE 122 450 DOUBLE Y BRANCH



PLATE 123 INCREASER



PLATE 124
ROOF CONNECTION



PLATE 125
BRASS SOLDERING
NIPPLE

BLACK

SizeInches	1 1/4	1 1/2	2	2 1/2	3	4	5	6	7	8	10
45° Y Branches Ea	.52	.65	.95	2.10	2.65	3.85	7.10	10.50	19.00	25.00	52.00
Reducing 45° Y			8.8							100	
BranchesEach		.72	1.05	2.30	2.90	4.25	7.80	11.50	21.00	27.50	
45° Double Y											
BranchesEach	.90	1.00	1.45	3.25	4.00	5.75	10.75	16.00	28.50	38.00	78.00
Reduc'g 45° Double											
Y Branches, Each			1.60	3.60	4.40	6.35	11.75	17.50			
Reducing 60° Y											
BranchesEach		.72	1.05	2.30	2.90	4.25	7.80	11.50	21.00	27.50	
IncreasersEach					2.50	3.75	5.50	6.50		15.00	
Roof Connect'ns Ea			1.15		1.20	1.50	2.00	4.25			
Brass Soldering				- 4							
NipplesEach	.90	1.05	1.50		2.75	4.00	9.00				

GALVANIZED

SizeInches	11/4	1 1/2	2	2 1/2	3	4	5	6	7	8	10
45° Y Branches Ea.	.90	1.15	1.65	3.70	4.65	6.75	12.50	18.50	33.25	44.00	91.00
BranchesEach		1.25	1.85	4.00	5.10	7.40	13.65	20.00	37.00	48.00	
45° Double Y BranchesEach		1.75	2.55	5.70	7.00	10.00	18.80	28.00	50.00	66.50	137.00
Reduc'g 45° Double Y Branches. Each			2.80	6.30	7.70	11.00	20.50	30.50			
Reducing 60° Y BranchesEach		1.25	1.85	4.00	5.10	7.40	13.65	20.00	37.00	48.00	
IncreasersEach Roof Connect'ns Ea			2.00		$\frac{4.40}{2.10}$	$\frac{6.55}{2.60}$	$9.65 \\ 3.50$	$\frac{11.35}{7.40}$		26.25	



CAST IRON DRAINAGE FITTINGS SCREWED FOR IRON PIPE



PLATE 126 S TRAP



PLATE 127 HALF S TRAP



PLATE 128 RUNNING TRAP



PLATE 129 OFFSET

LA	

SizeInches	$1\frac{1}{2}$	2	3	4	5	6	7	8	10
S TrapsEach Half S TrapsEach Running TrapsEach Offsets:	1.70	2.20	5.00	10.00	21.50	32.50	40.00	55.00	
To Offset 4 inches. Each To Offset 6 inches. Each		2.40	4.00	5.75	9.00	12.50			
To Offset 8 inches. Each To Offset 10 inches. Each To Offset 12 inches. Each		$\frac{2.60}{2.85}$	$\frac{4.75}{5.50}$	$6.50 \\ 7.50$	$\frac{10.00}{11.00}$	$13.50 \\ 14.50$		E E total	

GALVANIZED

SizeInches	$1\frac{1}{2}$	2	3	4	5	6	7	8	10
S TrapsEach Half S TrapsEach Running TrapsEach	3.00	3.85	8.75	17.50	37.50	57.00	70.00	95 00	
Offsets: To Offset 4 inches.Each To Offset 6 inches.Each		4.20	7.00	10.00	15.75	22.00	1000000		
To Offset 10 inches Each		$\frac{4.55}{5.00}$	9.65	$\frac{11.35}{13.15}$	$\frac{17.50}{19.25}$	$\frac{23.50}{25.50}$			
To Offset 12 inches. Each				15.00	21.00	27.00			



AMMONIA VALVES



PLATE 7810



PLATE 781

FLANGED GLOBE VALVES

PLATE 7810

Size	1/2	3/4	1	11/4	1 1/2	2	21/2	3	4
Length of Body. Outside Diameter of Flange. With Bolts, each. With Companion Flanges,	4 17/8x3 18 4.50	$ \begin{array}{c c} 6 \frac{1}{4} \\ 4 \frac{1}{2} \\ 6.00 \end{array} $	$\begin{array}{c} 6 \\ 4\frac{1}{2} \\ 7.50 \end{array}$	7 5 9.50	8 5 16.00	$ \begin{array}{c} 10 \\ 6\frac{1}{2} \\ 18.00 \end{array} $	$ \begin{array}{r} $	$ \begin{array}{r} \hline 12\frac{1}{2} \\ 8\frac{3}{4} \\ 37.00 \end{array} $	$ \begin{array}{r} 15 \\ 8\frac{3}{4} \\ 61.00 \end{array} $
Bolts and Gaskets, each	5.55	7.35	8.85	11.40	17.90	20.65	33.05	42.55	66.55

FLANGED ANGLE VALVES

PLATE 7811

Size	1/2	3/4	1	11/4	1 1/2	2	2 1/2	3	4
Center of Valve to face of Flange Outside Diameter of Flange. With Bolts, each. With Companion Flanges, Bolts and Gaskets, each.	17/8 x3 16 4 . 50	6.00		$3\frac{1}{2}$ 9.50 11.40		5 6½ 18.00	30.00		





PLATE 7812 FLANGED ELBOW.

FLANGED ELBOW

Size	1	1	1	11/4	11/4	$1\frac{1}{2}$	$1\frac{1}{2}$	2	3	4	5
Outside Diameter of Flange Center of Pipe to Face of	4 1/2	5	6 1/2	5	6 ½	5	$6\frac{1}{2}$	$6\frac{1}{2}$	8 3/4	8 3/4	101/2
Flange	$\frac{2\frac{5}{8}}{2.50}$	$2\frac{5}{8}$ 2.75	$\frac{3\frac{3}{8}}{4.75}$	$\frac{3\frac{1}{2}}{3.75}$	$\frac{3\frac{3}{8}}{4.75}$	$\frac{3}{4.85}$	$\frac{2\frac{3}{4}}{4.85}$	$\frac{3}{5.00}$	$\frac{4\frac{3}{4}}{11.25}$	$\frac{5\frac{1}{8}}{12.50}$	$\frac{6\frac{1}{2}}{21.25}$
With Companion Flanges, Bolts and Gaskets, each		30.00									

Note.—Flanged Elbow. sizes to 4 inch, inclusive, four bolt; 5 inch, six bolt. Always state whether wanted with Male or Female Flange.



PLATE 7813

SQUARE FLANGE ELBOW

Size	$1\frac{1}{4}$	1 1/2	2	2 1/2	3	3 1/2	4	5
Center to Face Outside Size of Flange	4 1/4	4 1/4	4 1/4	6 55/8 5.50	6	61/2	7	7 1/2
As Illustrated, each Complete with Companion Flanges,	2.25	2.50	3.00	5.50	7.00	9.00	12.00	15.00
Bolts and Gaskets, each	4.75	5.00	6.00	11.00	13.50	16.00	21.00	26.00









PLATE 7814

FULL FLANGED ELBOW

Size....

Outside Diameter of Flange..

As Shown, M. or F., each.... With Companion Flanges,

Bolts and Gaskets, each

PLATE 7815
FULL FLANGED TEE

PLATE 7816 FLANGED TEE PLATE 7817 TEE FLANGES

FULL FLANGED ELB	ow.	FUL		LAN		D		LBC	ED TI	EE.	TE	EE FLA	NGES.
Size				2		2	1/2		4	5		6	8
No. Bolts Outside Diameter of As Shown, M. or F With Companion Gaskets, each	of Flan ., each Flang	nge i es, Be	olts an	61 4.0	0	6.8 13.	88	9	8 3 ³ / ₄ .75	12 $10\frac{1}{2}$ 15.0 35.5	20		12 $15\frac{1}{2}$ 48.75 76.65
		F	ULL	FLA	NG	E)	TE	E				
Size				$\frac{1}{2}$		1	1	1/4	1 1/2	2	3	4	6
No. Bolts Outside Diameter of As Shown, M. or F With Companion F.	of Flar ., each langes	nge h s, Bolt	s and	6 1%x3.3 1.75	3	$\frac{12}{\frac{1}{2}}$. 63	4	2 5 .38	$ \begin{array}{c} 12 \\ 5 \\ 5 .50 \end{array} $			1	18 12 38.25
Gaskets, each				5.75 ANG		. 55 T			12.17	17.25	34.20	37.95	75.80
				ANGE	- 0	_		-	_	,			,
Size Run Size Outlet	1	1 1/4	$\frac{1\frac{1}{4}}{2}$	$\frac{2}{1}$		$\frac{2}{1\frac{1}{4}}$		2 ½ 1 ¼	3		3 2	4 2	5 2
Outside Diameter of Flange	5 5.62	6½ 8.75	0.50	6½&8 14.38		$\frac{1}{2}$ &8	A 1981	8 3/4 16.2	8 ³ / ₄ 5 15.0		&10½		$10\frac{1}{2}$
Flanges, Bolts and	10.10	14.75	12.25	21.55	2	1.10		28.2	5 26.9	5 37	7.05	26.95	46.15
			TE	E FL	AN	IGE	ES						
Size			1/2	1/2		1		1	1	1	1/4	11/4	1 ½
Outside Diameter o As Shown, M. or F. With Companion Bolts and Gasket	, each Flang	es,	$ \begin{array}{r} 4 \\ 1.75 \\ 3.20 \end{array} $	$ \begin{array}{c} 4 \frac{1}{2} \\ 3.12 \\ 4.80 \end{array} $	3.	$\frac{1}{2}$.12 .80		.75 .00	6 ½ 5.00 8.00	3.	75 5	6½ 5.00	5 3.75 6.00
		-		1	-	-	-		-				

Note.—Tee Flanges, are all four bolt. In ordering, specify whether wanted with Male or Female Flange.

6 1/2

6.25

9.25

2

8.13

12.30

2

834

8.75

3

6 1/2

10.62

3

14.75 13.62 21.00 16.75 21.00

4

4

1 1/2

6 1/2

5.00

8.00



SQUARE FLANGE TEE

SQUARE FLANGE TEE. FOUR BOLT

	-										
Size Run Size Outlet	$1\frac{1}{2}$ $1\frac{1}{2}$	$\frac{1}{2}$	$\frac{2}{1\frac{1}{2}}$	2 2	2 1/2	2 3	2 1/2	2 ½ 2 ½	21/2	2½ 3½	3 2
Face to Face, Run Center to Face, Out-		81/2	81/2	81/2	8 1/2	8 1/2	12	12	12	12	12
letOutside Size Flange,	4.1/	4 1/4	4 1/4	4 1/4	6	6	6	6	6	61/2	6
RunOutside Size Flange.	4	4	4 1/2	412	4 1/2	4 1/2	55/8	55/8	55/8	55/8	61/8
Outlet	$\frac{4}{3.75}$	$\frac{4\frac{1}{2}}{3.75}$	4 4 . 00	$\frac{4\frac{1}{2}}{4.00}$	55% 5.50	6½ 6.50	$\frac{4\frac{1}{2}}{7.25}$	55/8 8.00	6½ 9.50	65/8 10.50	4½ 9.50
Bolts and Gaskets, each	7.50	8.00	8.00	8.00	11.50	12.00	13.25	15.00	16.75	18.25	16.00
Size Run	3 2½	3 3	3 1/2	3 4	3½ 2	3 ½ 2 ½	312	3 ½ 3 ½	3½ 4	3 1/2	4 2
Face to Face, Run	12	12	12	12	13	13	13	13	13	13	14
Center to Face, Out- let	6	6	$6\frac{1}{2}$	7	6 1/2	6 1/2	6 1/2	6 1/2	7	7 1/2	7
Run	61/8	61/8	61/8	61/8	65/8	65/8	65/8	65/8	65/8	65/8	71/8
Outside Size Flange, Outlet	55/8	61/8	65%	71/8	4 1/2	55/8	61/8	65/8	71/8	8	4 1/2
As Illustrated, each	10.00	10.50	11.25	12.00	12.50	13.00	13.50	14.00	14.00	15.00	14.50
Bolts and Gaskets each	17.50	18.00	19.25	21.00	19.75	21.50	22.50	23.00	24.00	26.00	24.00
Size Run	$\frac{4}{2\frac{1}{2}}$	4 3	4 3½	4 4	4 5	5 2	5 2 ½	5 3	5 3½	5 4	5 5
Face to Face Run Centre to Face, Out-	14	14	14	14	14	15	15	15	15	15	15
letOutside Size Flange,	7	7	7	7	$7\frac{1}{2}$	7 1/2	$7\frac{1}{2}$	7 1/2	$7\frac{1}{2}$	7 1/2	$7\frac{1}{2}$
Run	$7\frac{1}{8}$	71/8	71/8	71/8	71/8	8	8	8	8	8	8
Outlet	$\frac{55\%}{15.00}$	$\frac{61/_{8}}{15.50}$	$6\frac{5}{8}$ 16.00	$7\frac{1}{8}$ 16.00	8 17.00	$\frac{4\frac{1}{2}}{17.00}$	55/8 18.00	$6\frac{1}{8}$ 19.00	$\frac{65\%}{20.00}$	$7\frac{1}{8}$ 21.00	8 22.00
Bolts and Gaskets each	25.25	26.00	27.00	28.00	30.00	29.00	30.50	31.50	33.00	35.00	37.00



PLATE 7819

AMMONIA BUSHINGS

Size	1x½	1 1/4 x 1/2	1 1/4 x 1	1 ½x ½	2x ½	2x1	2x1 1/4
Each	.75	.75	.75	1.00	1.25	1.25	1.25
Size	2x1½	2 ½x ½	2½x1	2 ½x1 ¼	2½x2	3x ½	3x1
Each	1.25	1.95	1.95	1.95	1.95	2.4	0 2.40
Size	1 0 11/	3x1½	3x2	3x2½	4x ½	4x1	4 x1 1/4
Each	- 10	2.40	2.40	2.40	4.50	4.50	4.50
Size		4x2	4x2½	4x3	5x11/4	5x1½	5x2
Each	1 70	4.50	4.50	4.50	8.50	8.50	8.50
Size	1	5x4	6x2	6x3	6x4	6x5	7x3
Each	. 8.50	8.50	8.75	8.75	8.75	8.75	10.00
Size	1	7x6	8x6	8x7	2 220		
Each	10.00	10.00	11.25	11.25			

AMMONIA FLANGES. MILD STEEL



PLATE 7820

SQUARE FOUR-BOLT FLANGES, MALE AND FEMALE

Size	1/4	3/8	1/2	1/2	1/2	1/2	1/2	1/2	3/4	3/4	3/4
O. D. of Flange Flanges, M. or F., each	4 1.00	4 1.00	4 1.00	$\frac{4\frac{1}{2}}{1.25}$	5 1.75	6	$\frac{6\frac{1}{2}}{2.25}$	$\frac{8\frac{3}{4}}{4.75}$	$\frac{4}{1.25}$	$\frac{4\frac{1}{2}}{1.25}$	$\begin{smallmatrix} 5\\1.75\end{smallmatrix}$
Per Pair with Bolts and Gasket	2.40	2.40	2.40	2.90	3.95	4.35	5.25	10.75	2.90	2.90	3.95
Size	1	1	1	1		11/4			$1\frac{1}{4}$	1 1/2	1 1/2
O. D. of Flange. Flanges, M. or F., each Per Pair with Bolts and Gasket.	$\frac{4}{1.00}$	$\frac{4\frac{1}{2}}{1.25}$	5 1.75 3.95	6 1.80 4.35	$6\frac{1}{2}$ 2.25 5.25	5 1.75 3.95	6 1.80 4.35	$\frac{6\frac{1}{2}}{2.25}$ 5.25	$ \begin{array}{r} 8\frac{3}{4} \\ 4.75 \\ 10.75 \end{array} $	5 1.75 3.95	6 1.80 4.35
Size	-		2	2	2	2	2	2 1/2	2 1/2	3	4
O. D. of Flange Flanges, M. or F., each	$\frac{6\frac{1}{2}}{2.25}$	8 ³ / ₄ 4 . 75	1.80	2.25	2 75	3.38	8 34 4 . 75 10 . 75	7 4.50 6.25		4.75	30,000,000



PLATE 7821

SQUARE FOUR-BOLT BLANK FLANGES

Sizes to 83/4, inclusive, 4-bolts; larger, 6-bolts.



PLATE 7822

SQUARE FLANGE CROSS. FOUR BOLT

	-				-		-			1		
Size Run	$\frac{1}{1}\frac{1}{2}$	$1\frac{2}{1\frac{1}{2}}$	$\frac{2}{2}$	$\overset{2}{\overset{1}{\overset{1}{2}}}_{2}$	$2\frac{1}{2}$ $2\frac{1}{2}$	3 2	$\frac{3}{2\frac{1}{2}}$	3 3	$\frac{3\frac{1}{2}}{2}$	$\frac{3\frac{1}{2}}{2\frac{1}{2}}$	$\frac{3\frac{1}{2}}{3}$	$\frac{3\frac{1}{2}}{3\frac{1}{2}}$
Face to Face, Run Face to Face, Outlet. Outside size of Flange,		8½ 8½ 8½	$\frac{81/2}{81/2}$	12 12	12 12	12 12	12 12	12 12	13 13	13 13	13 13	13 13
Run	4.	4 1/2	$4\frac{1}{2}$	$5\frac{5}{8}$	55%	61/8	61/8	61/8	65/8	$6\frac{5}{8}$	65/8	$6\frac{5}{8}$
Outside size of Flange, OutletAs Illustrated, each	4 5.00	4 6.00	$\frac{4\frac{1}{2}}{6.00}$	$\frac{4\frac{1}{2}}{9.00}$	$\frac{5\%}{10.00}$	$\frac{4\frac{1}{2}}{11.00}$	$\frac{5\%}{11.50}$	$6\frac{1}{8}$ 12.00	$\frac{4\frac{1}{2}}{13.00}$	$\frac{5\%}{14.50}$	$\frac{6\frac{1}{8}}{16.25}$	$6\frac{5}{8}$ 18.00
Complete with Companion Flanges, Bolts and Gaskets, each		10.75	11.50	16.25	18.25	18.50	21.00	22.00	21.50	26.00	28.00	30.00
Size Run		4 2	4 2 ½	4 3	4 3½	4 4	5 2	5 2 1/2	5 3	5 3 ½	5 4	5 5
Face to Face, Run		14	14	14	14	14	15	15	15	15	15	15
Face to Face, Outlet. Outside size of Flange,	Run.		$\frac{14}{7\frac{1}{8}}$	$\frac{14}{7\frac{1}{8}}$	$\frac{14}{7\frac{1}{8}}$	$\frac{14}{7\frac{1}{8}}$	15 8	15 8	15 8	15 8	15 8	15 8
Outside size of Flange,		41/2	55/8	61/8	65%	71/8	4 1/2	$\frac{5\%}{24.25}$	61/8	65/8	71/8	8
			20.00	21.00	22.00	25.00	25.00	24.25	20.00	27.50	29.00	0.06
As Illustrated, each Complete with Corion Flanges, Bolts Gaskets, each	and							39.25				



EXTRA HEAVY STEEL FITTINGS

FOR AIR, HYDRAULIC, HIGH PRESSURE STEAM AND ICE MACHINE CONSTRUCTION

TESTED 7000 POUNDS. SUITABLE FOR 2000 POUNDS WORKING PRESSURE



PLATE 8543 ELBOW



PLATE 8544 TEE



PLATE 8545 RETURN BEND

STOCK SIZES

ELBOWS

Size. Inches	1/4	3/8	1/2	3/4	1	11/4	$1\frac{1}{2}$	2	21/2	3	3 1/2	4	5	6
Fach	1.20	1.20	1.80	2.10	2.52	3.90	4.80	6.90	9.00	12.60	24.00	26.00	31.80	66.00

TEES

SizeInches	1/4	3/8	1/2	$\frac{3}{4}$	1	11/4	$1\frac{1}{2}$	2	2 1/2	3	4	5	6
Fach	1.56	1.56	2.64	3.00	3.90	5.10	7.50	10.20	13.20	18.60	24.60	48.00	90.00

REDUCING TEES

SizeInches	3 x 2	3 x 4	4 x 2	4 x 3
Priceeach	21.60	28.50	28.50	28.50

RETURN BENDS

Return Bends Size, Inches	Stock Sizes Inches, C to C	Each
1	134	3.36 3.36
114	3	8.70
1 1/2	31/2	$10.20 \\ 10.20 \\ 10.60$
2 2	3 1/2	$10.80 \\ 14.40 \\ 13.80$
$\frac{2}{2}\frac{1}{2}$	8	16.80 51.60

Faces Countersunk for Soldering.

HYDRAULIC FITTINGS

BRONZE

STANDARD FOR PRESSURES TO 5,000 POUNDS SPECIAL FOR PRESSURES TO 20,000 POUNDS



PLATE 3525 ELBOW



PLATE 3526 TEE



PLATE 3527 CROSS



PLATE 3528



PLATE 3529 COUPLING



PLATE 3530 UNION



PLATE 3531 FLANGE UNION

SizeInches	1/4	3/8	1/2	3/4	1	11/4	1 1/2	2
Hydraulic Elbow. each Hydraulic Tee each Hydraulic Cross. each Hydraulic Nipple each	$\frac{1.80}{2.44}$	$\frac{2.50}{3.32}$	$\frac{3.70}{4.96}$	$\frac{5.50}{7.40}$	7.30 9.80	$11.70 \\ 15.52$	$15.60 \\ 20.76$	30.00

SizeInches	1/4	3/8	1/2	3/4	1
Hydraulic Coupling each Hydraulic Union each Hydraulic Flange Union each	3 20	3 90	4 40	5 40	6 60
Size Inches	11/4	1 1/2	2	21/2	3
Hydraulic Coupling each Hydraulic Union each Hydraulic Flange Union each	5.44 9.60 19.20	8.00 12.80 22.80	14.40 16.60 17.10	22.50 32.40	34.00 37.20



HYDRAULIC VALVES BRONZE

STANDARD FOR PRESSURES TO 5,000 POUNDS SPECIAL FOR PRESSURES TO 20,000 POUNDS





PLATE 3532 STOP VALVE, 34 INCH AND SMALLER

STOP VALVE, 1 INCH AND LARGER

SizeInches	1/4	3/8	1/2	3/4	1	11/4	1 1/2	2
Stop Valve, Plate 3532 or Plate 3533	8.60	9.30	11.30	14.80	22.00	36 00	50 00	90 00





PLATE 3534
CHECK VALVE, 34 INCH AND SMALLER

PLATE 3535 CHECK VALVE, 1 INCH AND LARGER

SizeInches	1/4	3/8	1/2	3/4	1	11/4	1 1/2	2
Check Valve, Plate 3534 or Plate 3535	7.30	8.30	10.00	12.30	20.00	34.00	44.00	82.00

HYDRAULIC PLAIN SCREW STEM VALVES



6,000 POUNDS TEST

PLATE 3536 STOP VALVE

SizeInches	3/8	1/2	3/4	1	1 1/4	1 1/2
Class A Thread. Class C Thread. Class D Thread.	12.00	18 00	24 00	22 00	44 00	CO OO

Class A.—Inside straight thread for right and left couplings. Class C.—Inside taper thread for standard pipe thread. Class D.—For flange couplings.

BRASS EXPANSION JOINTS



PLATE 450

STANDARD TRAVERSE

Size Inches	1/2	3/4	1	1 1/4	$1\frac{1}{2}$	2	2 1/2	3
Traverse Inches	2	21/4	2 1/4	21/4	21/4	2 1/2	2 1/2	2 3/4
Price	1.50	2.20	2.75	4.00	5.00	8.00	17.50	24.00

SPECIAL TRAVERSE

SizeInches	3/4	1	11/4	$1\frac{1}{2}$	2	2 1/2	3
Traverse	2 1/2	3	3 1/2	4	5	6	7
Price	2 25	5.20	6.20	7.40	12.50	24.00	30.00

BRASS SWING JOINTS



PLATE 451 CURVED



PLATE 452 UNIVERSAL

SizeInches	1/4	3/8	1/2	3/4	1	11/4	1½	2	21/2
Curved or Straight	1.00	1.25	1.75	2.40	3.50	4.50	6.25	9.00	22.00
Universal	2.00	2.50	3.50	4.80	7.00	9.00	12.50	18.00	44.00



IRON BODY EXPANSION JOINTS



BRASS SLEEVE



PLATE 490 SCREWED REGULAR TRAVERSE PLATE 491 FLANGED REGULAR TRAVERSE

SCREWED ENDS-STANDARD TRAVERSE

Size	2	21/2	3	31/2	4	4 1/2	5
Price	7.00	8.00	10.00	14.00	18.00	30.00	38.00
TraverseInches	21/2	21/2	23/4	3	31/4	31/2	4
Size	6	7	8	9	10	12	
Price	45.00	70.00	100.00	110.00	160.00	225.00	
TraverseInches	5	6	7	7	7	8	

SCREWED ENDS-SPECIAL TRAVERSE

SizeInches	2	$2\frac{1}{2}$	3	3 1/2	4	5	6	7	8
Price	13.00	15.50	21.00	25.00	31.00	45.00	55.00	80.00	110.00
Traverse Inches	5	6	7	8	9	10	11	12	12

FLANGED ENDS-STANDARD TRAVERSE

Size	2	$2\frac{1}{2}$	3	31/2	4	$4\frac{1}{2}$	5	6
Price, Faced Price, Faced and Drilled	15.00 15.75	16.00 16.75	18.50 19.25	25.00 26.00	30.00 31.25	40.00 41.50	48.00 49.50	55.00 56.75
TraverseInches	21/2	21/2	23/4	3	31/4	$3\frac{1}{2}$	4	5
Size	7	8	9	10	12	14	15	16
Price, Faced Price, Faced and Drilled	80.00 82.25	110.00 112.25	120.00 122.50	175.00 177.50	250.00 253.50	500.00 504.00	550.00 554.50	600.00 605.00
TraverseInches	6	7	7	7	8	10	10	10

FLANGED ENDS-SPECIAL TRAVERSE

SizeInches	$2\frac{1}{2}$	3	3 1/2	4	5	6	7	8
Price	22.00	29.00	35.00	44.00	63.00	80.00	110.00	150.00
TraverseInches	6	7	8	9	10	11	12	12



STANDARD IRON BODY GLOBE AND ANGLE VALVES

WITH YOKE



PLATE 466 GLOBE, SCREWED



PLATE 467 ANGLE, SCHEWED



PLATE 468 GLOBE, FLANGED



PLATE 469 ANGLE, FLANGED

SizeInches	2	$2\frac{1}{2}$	3	3 1/2	4	$4\frac{1}{2}$	5	6
Screwed, Globe and Angle. Flanged, Globe and Angle.	7.00 8.60	$9.00 \\ 10.75$	12.50 15.00	$15.25 \\ 18.50$	$\frac{19.00}{22.50}$	$\frac{24.00}{27.50}$	27.00 31.00	37.50 42.00
SizeInches	7	8	9		12	14	16	
Screwed, Globe and Angle. Flanged, Globe and Angle.	$63.00 \\ 68.00$	$72.00 \\ 77.00$	100.00 110.00	$114.00 \\ 123.00$	170.00 187.00	350.00	475.00	



STANDARD IRON BODY CHECK VALVES BRASS MOUNTED



PLATE 479 HORIZONTAL CHECK, SCREWED



PLATE 480 ANGLE CHECK SCREWED

SizeInches	1	1 1/4 1	1/2 2	2 1/2	3	3 1/2	4 4 }	2 5
Hor. and Angle, Screwed. Hor. and Angle, Flanged. Vertical, Screwed Vertical, Flanged			$5.2 \\ 7.0$	$\begin{array}{ccc} 25 & 8.25 \\ 0 & 9.50 \end{array}$	$11.50 \\ 12.50$	15.50 17.00	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{bmatrix} 50 & 26.00 \\ 00 & 33.00 \end{bmatrix}$
SizeInches	6	7	8	9	10	12	14	16
Hor. and Angle, Screwed. Hor. and Angle, Flanged. Vertical, Screwed. Vertical, Flanged.	$\frac{35.00}{40.00}$	50.00 62.00	$\frac{62.00}{73.00}$	105.00	115.00	175.00	300.00	425.00

IRON BODY SWINCING CHECK VALVES



PLATE 481 SCREWED

SizeInches	$2\frac{1}{2}$	3	3 ½	4	4 1/2	5
Screwedeach Flangedeach	12.00 14.50	13.50 17.00	17.50 21.00	20.00 24.00	26.00 30.00	30.00 34.00
SizeInches	6	7	8	10	12	14
Screwed. each Flanged. each	36.00 41.00	55.00 60.00	70.00 75.00	110.00 115.00	160.00 168.00	340.00



STANDARD IRON BODY VALVES BRASS MOUNTED, WITH JENKINS STANDARD DISCS



PLATE 3504 ANGLE, FLANGED



PLATE 3505 GLOBE, SCREWED

IRON BODY JENKINS DISC GLOBE OR ANGLE VALVES, SCREWED

SizeInches	1 ½	2	$2\frac{1}{2}$	3	3 1/2	4	41/2
Screwed BonnetEach YokedEach	5.00	$7.25 \\ 10.00$	$\frac{11.00}{12.00}$	16.00 16.75	19.50	24.00	32.00
SizeInches	5	6	7	8	10	12	• • •
YokedEach	40.00	48.00	80.00	90.00	130.00	185.00	

JENKINS DISC IRON BODY GLOBE OR ANGLE VALVES, FLANGED

SizeInches	2	21/2	3	31/2	4	4 1/2
Diameter of FlangeInches	6	7	7 ½	8 1/2	9	9 1/4
Screwed BonnetEach YokedEach				21.50	26.00	34.00
SizeInches	5	6	7	8	10	12
Diameter of FlangeInches	10	11	121/2	131/2	16	19
YokedEach	42.00	50.00	80.00	90.00	130.00	185.00

JENKINS DISC CROSS VALVES WITH YOKE

SizeInches	$2\frac{1}{2}$	3	3 1/2	4	$4\frac{1}{2}$	5	6	7	8
Screwed Each	16.00	21.00	26.00	30.00	42.00	45.00	58.00	90.00	100.00
Flanged Each	19.00	24.00	29.00	33.00	45.00	48.00	62.00		100.00

JENKINS BROS. IRON BODY VALVES

BRASS MOUNTED

WITH YOKE



PLATE 5330 GLOBE, FLANGED



PLATE 5331 ANGLE, SCREWED



PLATE 5332 CROSS, SCREWED

SCREWED

SizeInches	2	21/2	3	$3\frac{1}{2}$	4	41/2	5
Globe or Angle Valveseach Cross Valveseach	10.00	$\frac{12.00}{16.00}$	$\frac{16.75}{21.00}$	19.50 26.00	24.00 30.00	32.00 42.00	40.00 45.00
SizeI	nches	6	7	8	9	10	12
Globe or Angle Valves	.each	48.00 58.00	80.00 90.00	90.00 100.00	121.00	130.00	185.00

FLANGED

SizeInches	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5
Globe or Angle Valves each Cross Valves each	11.75	14.00 19.00	$\frac{18.50}{24.00}$	21.50 29.00	26.00 33.00	34.00 45.00	42.00 48.00
Size	Inches	6	7	8	9	10	12
Globe or Angle Valves	each	50.00 62.00	80.00 90.00	90.00 100.00	121.00	130.00	185.00



JENKINS BROS. IRON BODY CHECK VALVES



PLATE 3026 HORIZONTAL, SCREWED



PLATE 3027 ANGLE, SCREWED

HORIZONTAL, ANGLE AND VERTICAL CHECK VALVES

SizeInches	2	$2\frac{1}{2}$	3	31/2	4	$4\frac{1}{2}$	5	6
Screwed each Flanged each	8.00 10.00	11.00 13.00	14.00 16.50	17.00 20.00	20.00 23.00	$\frac{25.00}{28.00}$	30.00 33.00	40.00 43.00
Diameter of Flanges inches	6	7	71/2	81/2	9	91/4	10	11

JENKINS DISCS FOR VALVES



PLATE 3028 NEW PATTERN



PLATE 3029 OLD PATTERN

SizeInches	1/4	3/8	1/2	3/4	1	11/4	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	31/2	4	$4\frac{1}{2}$
Each	.03	.04	.04	.05	.06	.09	.12	.18	. 24	.40	. 50	.60	.70
SizeInches	5	6	7	8	9	10	12	14	16	18	20	22	24
Each	. 80	1.00	1.20	1.40	1.80	2.25	2.50	3.50	4.00	5.00	6.00	7.50	9.00

Above Price List applies to both New and Old Patterns.

JENKINS STEAM METAL DISCS

FOR EXTRA HEAVY PRESSURE AND SUPERHEATED STEAM

SizeInches	1/4	3/8	1/2	3/4	1	11/4	1½	2	21/2	3
Each	.14	.14	.16	.20	.22	.28	.30	.34	. 60	.85
SizeInches	$3\frac{1}{2}$	4	4 1/2	5	6	7	8	9	10	12
Each	1.35	1.60	2.00	2.30	2.60	3.70	4.00	5.25	5.60	7.30



JENKINS BROS. Y OR BLOW-OFF VALVES

Suitable for 150 Pounds Working Steam Pressure, or 250 Pounds Working Water Pressure

STANDARD PATTERN, BRASS WITH RENEWABLE SEAT RINGS



PLATE 5506 SCREWED

SizeInches	3/8	1/2	3/4	1	11/4	1 ½	2	21/2	3
Screwedeach Flangedeach	2.00	2.00	3.00	4.00	5.00 11.00	6.50 13.00	9.25	18.00 28.00	25.00 37.00

STANDARD PATTERN, WITH YOKE IRON BODY, COMPOSITION MOUNTED WITH RENEWABLE SEAT RINGS



PLATE 5507 SCREWED

Size	2	2 1/2	3
Screwedeach	11.00	15.00	20.00
Flanged .each	13.00	18.00	23.00



POWELL UNION COMPOSITE DISC VALVES

WITH OUTSIDE SCREW STEM AND YOKE TOP IRON BODY. HEAVY PATTERN



PLATE 7823 GLOBE VALVE, SCREW ENDS



PLATE 7824
ANGLE VALVE, FLANGE ENDS

GLOBE AND ANGLE VALVES

SizeInches	2	$2\frac{1}{2}$	3	3 1/2	4	4 1/2	5	6	1 7	8
Screw Ends. Flange Ends. Composition Disc Soft Metal Disc Bronze Metal Disc Disc Holder. Disc Nut	.18	.24 .50 .60	.40 .76 .85 3.95	21.50 .50 .90 1.35 5.25	26.00 .60 1.35 1.60 6.40	$ \begin{array}{r} 34.00 \\ .70 \\ 1.60 \\ 2.00 \\ 7.95 \end{array} $	$ \begin{array}{r} \hline 40.00 \\ 42.00 \\ .80 \\ 1.85 \\ 2.30 \\ 12.00 \\ 1.25 \\ \end{array} $	$\begin{bmatrix} 50.00 \\ 1.00 \\ 2.35 \\ 2.60 \\ 16.00 \end{bmatrix}$	80.00 1.20 2.50 3.70 22.25	90.00 1.40 3.25 4.00 28.65

CROSS VALVES

SizeInches	2 1/2	3	3 1/2	4	4 1/2	5	6	7	8
Screw Ends	16.00 19.00	21.00 24.00	26.00 29.00	30.00 33.00	42.00 45.00	$\frac{-}{45.00}$ $\frac{45.00}{48.00}$	50.00 62.00	90.00 90.00	100.00

CHECK VALVES

Sizenenes										
Horizon, S. E. Horizon, F. E. Angle, S. E. Angle, F. E.	8 00	11 00	14 00	17 00	23.00	28.00	33.00	43.00	65.00	80.00

IRON BODY THROTTLE VALVES



SizeInches	2	$2\frac{1}{2}$	3	3 ½
Screwed Flanged	$22.50 \\ 24.00$	$\frac{30.00}{32.00}$	$\frac{40.00}{42.50}$	50.00 53.00
SizeInches	4	$4\frac{1}{2}$	5	6
Screwed Flanged	60.00 64.00	88.00 91.00	$106.00 \\ 110.00$	$120.00 \\ 125.00$

PLATE 482

STANDARD IRON BODY SAFETY AND BACK PRESSURE VALVES BRASS MOUNTED



PLATE 483 THREE-WAY SAFETY, FLANGED



PLATE 434 BACK PRESSURE

GLOBE, ANGLE AND THREE-WAY SAFETY VALVES

SizeInches	1	1 1 1/4	1 ½	2	2 1/2	3	3 1/2
Screwed	4.00	5.00		7.80 10.25		17.25 21.50	23.00 27.50
SizeInches	4	4 1/2	5	6	7	8	
Screwed			41.50 48.00	57.75 65.00	93.50 100.00	$132.00 \\ 140.00$	

BACK PRESSURE VALVES

SizeInches	2	2 1/2	3	3 ½	4	4 1/2	5	6
Screwed Flanged		13.00 15.00	15.00 17.50	19.00 22.00	22.50 26.00	28.50 32.00	33.50 37.00	$\frac{43.00}{47.00}$
SizeInches	7	8	9	10	12	14	16	
Screwed Flanged	70.00 75.00	85.00 90.00	110.00 120.00	120.00 130.00	180.00 200.00	350.00	475.00	



EXTRA HEAVY IRON BODY VALVES

WITH YOKE

For 250 Pounds Working Pressure.

Tested to 800 Pounds Hydraulic Pressure per Square Inch.



PLATE 3018 GLOBE VALVE

LOBE VALVE

GLOBE AND ANGLE VALVES—SCREWED

Sizes....In. 2 2½ 3 3½ 4 4½ 5 6 7 8 10 12
Globe or Angle.ea. 18.00 21.50 28.50 36.00 41.50 52.00 60.00 73.00 125.00 150.00 225.00 325.00





PLATE 3020 GLOBE VALVE

PLATE 3021 ANGLE VALVE

SizesIn.	2	21/2	3	31/2	4	41/2	5	6	7	8	10	12
Globe or Angle.ea. Flgd with												
Size of By	$6\frac{1}{2}$	7½	81/4	9	10	10½	11	12½		186.00 15	285.00 $17\frac{1}{2}$	390.00 20
Pass in.									11/2	11/2	2	2



STANDARD IRON BODY BRASS MOUNTED GATE VALVES

STATIONARY STEM WEDGE DISC



PLATE 5333 SCREWED



PLATE 5334 FLANGED

SizeIn.	2	$2\frac{1}{2}$	3	31/2	4	41/2	5	6	7
Screwed. Ea. Flanged. Ea.	10.00 12.00	$\frac{11.50}{13.50}$	14.00 16.50	17.00 19.50	19.00 23.00	24.00 28.00	27.50 31.50	32.50 36.50	45.00 49.00
SizeIn.	8	9	10	12	14	15	16	18	20
Screwed Ea. Flanged Ea.	54.00 58.00	76.00 81.00	90.00 95.00	$125.00 \\ 133.00$	181.00	220.00	260.00	350.00	425.00



IRON BODY GATE VALVES



PLATE 7825 MEDIUM PRESSURE



PLATE 7826 EXTRA HEAVY PRESSURE

MEDIUM PRESSURE GATE VALVES

Size Inches	2	21/2	3	3 1/2	4	4 1/2	5
Screwed each Flanged each	15.00 17.50	17.00 19.50	$\frac{20.00}{23.00}$	25.00 28.00	28.00 33.00	35.00 35.00	40.00 45.00
Diameter of Flanges inches	61/2	71/2	81/4	9	10	10 1/2	11

EXTRA HEAVY GATE VALVES

SizeInche	S 11/4	11/2	2	21/2	3	3 1/2	4	4 1/2
Screwed Ends. Flanged Ends. Diameter of Flanges. inche	26 50	27 50	130 001	25 50	18 00	60 00	165 00	00 00
G:			1 7				10	12
Screwed Ends Flanged Ends Diameter of Flangesinches	90 00	107 00	125.00 132.00 14	0 169 /	00 000	0000	10 nn	335.00

INDICATOR POSTS



PLATE 496

This Indicator Post is designed expressly for valves connected with street mains, and for use with valves for fire service in mill and factory yards

This Indicator shows plainly at a glance whether valve is open or closed. It can

be supplied separate and used on any make of valve.

Always state number of turns to open Valve and whether Valve opens by turning to the LEFT or RIGHT.

Indicator Post only (for 5 feet trench), 40.00 Indicator Posts for other depths. Prices on application,

STANDARD IRON BODY BRASS MOUNTED GATE VALVES



PLATE 497

HUB ENDS

To open by turning stem to left and with a 2" square nut on stem unless otherwise ordered.

These valves are specially constructed for street mains to withstand rough usage incidental to such service.

SizeIn.	2	3	4	5	6
Hub EndEa.	10.00	14.00	19.00	27.50	32.50
SizeIn.	7	8	10	12	14
Hub EndEa.	45.00	54.00	90.00	125.00	173.00

FIRE HYDRANTS



PRICES AND INFORMATION ON APPLICATION

ROADWAY, SERVICE AND VALVE BOXES

(Revised June 1, 1917)







PLATE 5702





PLATE 5704

2 1/2-INCH SERVICE EXTENSION SECTION VALVE BOX ROUND HEAD, OPEN BASE ROADWAY BOX
ROADWAY BOX. OPEN BASE, ROUND HEAD, 41/4 INCH SHAFT.

142R 143R 144R 145R141Q 142Q 39 - 5446 - 60....inches 18-24 27 - 3427 - 4234 - 484.25 4.55each 3.90 4.10 3.00 3.35

SERVICE BOXES, 2½ INCH DIAMETER.

Number	Number		89A	90B	91C	92C	92D	93D	93E
Extension	inches	12 .80	12-20 1.00	18-26 1.05	21-33 1.20	24-38 1.30	$\frac{24-42}{1.45}$	$\frac{36-48}{1.55}$	$36-54 \\ 1.65$
Number	94D	94E	95	E 1	00E	100F	950	G	100G
Extensioninches Priceeach		$\frac{42-60}{1.75}$			4-72 2.05	54-78 2.15			$54-90 \\ 2.45$

EXTENSION SECTION

Number	58
Increasing Length of Box inches Price (Size, 5½ inches) each	$\begin{smallmatrix} 14\\1.35\end{smallmatrix}$

	VALVE	BOX,	NO.	BASE,	ROUND	HEAD,	51/4	INCH	SHAFT.	
on			IAA	A A A I	AIB	1 C 1	CC	D	EF	1 G

Number	211117	7171	21	D		-00				
Extension inches	17	22-28	28-40	36-48	42-54	48-60	$\frac{42-66}{7.30}$	48-72	60-84	72-96
Price each	4.60	5.55	5.80	6.30	6.55	6.90		7.90	8.40	9.10

IRON COCKS, STANDARD



PLATE 487 SQUARE HEAD



PLATE 488 FLAT HEAD



PLATE 489 THREE WAY

SizeInches	3/8	1/2	3/4	1	11/4	1½	2
All Iron Cocks, Screwed. Iron Cocks, with Brass Washer, Screwed. Iron Cocks, with Brass Plug, Screwed. Iron Cocks, with Brass Plug, Screwed. Iron 3-Way Cocks, With Brass Pseppending Screwed. Iron 3-Way Cocks, with Brass Plug, Screwed. Iron 3-Way Cocks, with Brass Plug, Screwed. Iron 3-Way Cocks, with Brass Plug, Screwed. Iron Cocks, With Brass Plug, Flanged. Iron Cocks, with Brass Washer, Flanged. Iron Cocks, with Brass Plug, Flanged. Iron Cocks, with Brass Plug, Flanged. 3-Way Iron Cocks, with Brass Plug, Flanged.	1.25	1.30 11.40 11.40 11	1.60 1.75 1.65 1.80 2.20 2.35	1.90 2.15 1.80 2.05 2.40 2.65	2.65 3.00 2.05 2.40 3.10 3.45 2.75 3.10 3.75 4.10 4.25 4.60 5.25	3.7. 4.1. 2.6. 3.0. 4.50 4.90 3.2. 3.6. 5.40 5.2. 5.6. 7.00	5.25 5.75 5.65 6.76 6.20 6.20 6.77 7.00 7.55 7.00 7.55 7.55 7.55 7.55 7
SizeInches 2	1/2	3	3 ½	4		5	6
tron Cocks, with Brass Plugs, Screwed. Iron Cocks, with Brass Plugs, Screwed. Iron Cocks, with Brass P. and W., Screwed. Iron 3-Way Cocks, Screwed. Iron 3-Way Cocks, with Brass Washer, Screwed. Iron 3-Way Cocks, with Brass Plug, Screwed. Iron 3-Way Cocks, with Brass Plug, Screwed. Iron Cocks, Flanged. Iron Cocks, with Brass Plugh, Screwed. Iron Cocks, with Brass Plugh, Screwed. Iron Cocks, with Brass Plugh, Flanged. Iron Cocks, with Brass Plugh, Flanged. Iron Cocks, with Brass Plugh, Flanged. Inton 3-Way Cocks, Flanged. Ill Iron 3-Way Cocks, Flanged. Ill Iron 3-Way Iron Cocks, with Brass Washer, Flanged. 9-Way Iron Cocks, with Brass Washer, Flanged.	1.15	7.75 1 3.00 2 3.00 2 5.00 1 3.50 1 3.75 3 3.75 3 3.75 3 3.75 3 3.75 3 3.75 3	14.00 27.50 29.50 14.00 16.00 32.00 15.00 17.00 32.00 20.00 22.00	36.5 40.0 19.0 22.5 40.0 43.5 19.0 22.5 40.0 43.5 26.0 29.5	0 38 0 67 0 73 0 36 0 42 0 71 0 76 0 42 0 70 0 42 0 70 0 42 0 70 0 42 0 70 0 42 0 70 0 36 0 42 0 70 0 36 0 42 0 70 0 36 0 42 0 70 0 36 0 42 0 70 0 70	3.00 7.00 3.00 3.50 2.50 5.50 5.00 5.00 5.00 5.00 5.00 5	45.00 53.00 94.00 52.00 60.00 100.00 50.00 58.00 108.00 68.00 108.00 116.00

Always state whether Square or Flat Heads are wanted. Unless otherwise ordered, we shall supply Flat Head Cocks.



IRON FOOT VALVES



PLATE 132 SCREWED



PLATE 133 FLANGED

Size	Inches	3/4	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	21/2	3	31/2	4
Plain, Screwed Plain, Flanged Galvanized, Screwed Galvanized, Flanged		i.75 i	.95	2.10	2.85	3.50	$\frac{4.50}{4.95}$	$\frac{5.75}{5.85}$	7.50 8.40	9.50
SizeInches	$4\frac{1}{2}$	5	6	1	8	10	12	1	14	16
Plain, Screwed	10.50 13.00 15.75 19.50	$14.00 \\ 16.90$	$\frac{17.5}{22.1}$	$\begin{array}{c} 0 & 45 \\ 5 & 61 \end{array}$.00	70.00 96.00	112.0 150.0	00 15	00.00	200.00

CAST IRON STRAINERS SCREWED

IRON FOOT VALVES
AND STRAINERS. SCREWED



PLATE 134



PLATE 135

ri.	CACT	IDON	STRAINERS.	SCREWED
	CASI	IRON	STRAINERS.	SCREWED

SizeInches	$\frac{3}{4}$	1	11/4	$1\frac{1}{2}$	2	21/2	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	8
PaintedEach GalvanizedEach	.30	.40	.50	.75	1.00	$\frac{1.50}{2.00}$	$\frac{2.00}{3.00}$	3.00	3.75	$\frac{-}{4.75}$	$\frac{4.75}{7.00}$	6.50	15.00 20.00

IRON FOOT VALVES AND STRAINERS. SCREWED

SizeInches	1/2	34	1	1 1/4	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
PriceEach	1.50	1.50	2.00	2.75	3.75	5.50	12.00	16.00



STANDARD BRASS GLOBE, ANGLE & CROSS VALVES



PLATE 6773 ANGLE, SCREWED



PLATE 6774 GLOBE, SCREWED



PLATE 6775 CROSS, SCREWED

SizeInches	1/8	1/4	3/8	1/2	3/4	1	11/4	1 1/2
Globe and Angle Valves, Screwed Cross Valves, Screwed Globe and Angle Valves, Flanged	.72	.72 1.25	.77 1.25	1.00 1.50 4.50	1.26 2.00 5.00	1.80 2.50 6.75	2.52 3.50 8.50	3.50 5.00 10.50
SizeInches	2	2 1/2	3	3 1	2	4	5	6
Globe and Angle Valves, Screwed. Cross Valves, Screwed. Globe and Angle Valves, Flanged.	5.30 8.00 16.00	10.00 16.00 23.00	24.00	45.0	00 60	.00	125.00	

FINISHED GLOBE, ANGLE & CHECK VALVES

SCREWED



SizeInches	1/8	1/4	3/8	1/2	3/4	1
Globe and Angle, Brass Wheel Clobe and Angle, Wood Wheel Gheck Valves, Horizontal	1.85	1.85	2.00	2.15	2.50	3.25
SizeInches	11/4	11/2	2	2	1/2	3
Globe and Angle, Brass Wheel Globe and Angle, Wood Wheel Check Valves, Horizontal	4.35	5.75	9.0		00.0	33.00 30.00 30.00

PLATE 6776



STANDARD BRASS CHECK VALVES



PLATE 4614 HORIZONTAL



PLATE 4615 VERTICAL



PLATE 4616

1/8	1/4	3/8	1/2	34	1	11/4
.65 	.65	.70	.90 4.40 1.00	1.15 4.90 1.26	1.60 6.50 1.80	2.25 8.25 2.52
1½	1 2	21/2	2.15	2.55	3.15	4.05
3.15	4.75	9.00	13.00 33.56	24.00 47.50	32.50 66.50	
3.50	5.30	10.00	14.40	26.50	36.00	
	.65 .72 1½ 3.15 10.15 3.50	.65 .65 .72 .72 .72 .72 	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$



PLATE 4617

STANDARD BRASS SWING CHECK VALVES

SizeInches	3/8	1/2	3/4	1	11/4
Screwed	1.80	2.00	2.25 10.00	$\frac{2.80}{12.50}$	3.65 17.00
Size Inches	$1\frac{1}{2}$	2	2 1/2	3	
ScrewedFlanged				24.00 65.00	

Brass Swing Check Valves Screwed with Leather Discs for Water at above lists and special discount.



STANDARD JENKINS DISC BRASS VALVES

For 125 Pounds Working Pressure



PLATE 3057 GLOBE VALVE



PLATE 3058 ANGLE VALVE

GLOBE, ANGLE AND CROSS VALVES

SizesInches	1/4	3/8	1/2	3/4	1	11/4	1½	2	21/2	3
Globe and Angle, Scrdeach Globe and Angle, Flgdeach Cross Valve, Screwedeach Cross Valve, Flangedeach	1.70	2 00	2 25	$\begin{bmatrix} 5.00 \\ 2.50 \end{bmatrix}$	$\frac{6.00}{3.25}$	9.00	11.00	16.50	25.00	34.00
Diameter of Flanges inches				31/2	4	41/2	5	6	7	71/2



PLATE 3059 HORIZONTAL CHECK VALVE



PLATE 3060 ANGLE CHECK VALVE

HORIZONTAL	AND	AI	NGL	E (CHE	CK	VAL	VES		
SizesInches	1/4	3/8	1/2	3/4	1	11/4	1 1/2	2	21/2	3
Hor. and Angle Check Valves, Sc. Hor. and Angle Check Valves, Fl.	1.10	1,20	1.30 4.00	1.90	$\begin{bmatrix} 2.60 \\ 0.6.00 \end{bmatrix}$	3.60	$5.00 \\ 10.00$	7.50 15.00	14.00 23.00	21.00



JENKINS BROS. BRASS VALVES



PLATE 3051 GLOBE



PLATE 3052 ANGLE



PLATE 3053 CROSS

STANDARD PATTERN SCREWED

SizeInches	1/8 & 1/4	3/8	1/2	3/4	1	11/4	1½	2	2½	3
Globe and Angleeach Crosseach	$\frac{1.10}{1.70}$	$\frac{1.25}{2.00}$	$\frac{1.60}{2.25}$	2.20 2.50	$\frac{2.80}{3.25}$	$\frac{4.00}{4.75}$	$\frac{5.50}{6.25}$	$8.75 \\ 9.50$	$15.75 \\ 20.00$	$\frac{22.00}{27.50}$

STANDARD PATTERN FLANGED

SizeInches	1/4	3/8	1/2	3/4	1	11/4	11/2	2	$2\frac{1}{2}$	3
Globe and Angleeach	W D 10 10 0	SOURCE IN SEC. AL	7 00	8 00	9 00	112.00	15.00	$16.50 \\ 23.00$	$\frac{25.00}{33.00}$	34.00 44.00
Diam. of Flanges ins.	23/4	27/8	3	31/2	4	41/2	5	6	7	71/2

EXTRA HEAVY SCREWED

SizeInches	1/4	3/8	1/2	3/4	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Globe and Angleeach Crosseach	3.00	3.50	4.00 4.75	5.00 5.75	6.50 7.50	8.25 9.50	$11.00 \\ 12.50$	$\frac{16.00}{18.00}$	33.00	45.00

EXTRA HEAVY FLANGED

SizeInches	1/2	3/4	1	11/4	$1\frac{1}{2}$	2	21/2	3
Globe and Angleeach Diameter of Flangesinches	6.00	7.50	$10.00 \\ 4\frac{1}{2}$	13.00 5	17.00 6	$24.00 \\ 6\frac{1}{2}$	$\frac{43.00}{7\frac{1}{2}}$	57.00 8¼



JENKINS BROS. BRASS CHECK VALVES

STANDARD PATTERN



PLATE 3054 HORIZONTAL



PLATE 3055



PLATE 3056 VERTICAL

SCREWED

SizeInches	1/8	1/4	3/8	1/2	3/4	1	11/4	1½	2	21/2	3
Priceeach	1.10	1.10	1.20	1.30	1.90	2.60	3.60	5.00	7.50	14.00	21.00

FLANGED

SizeInches	1/2	3/4	1	11/4	1½	2	21/2	3
Price each	4.00	5.00	6.00	8.00	10.00	15.00	23.00	32.00

JENKINS BROS. BRASS SWING CHECK VALVES

STANDARD PATTERN

SizeInches	3/8	1/2	3/4	1	11/4	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Screwed	1.20	1.30	1.90	2.60	3.60	5.00	7.50	14.00	21 00
Flanged		4.00	5.00	6.00	8.00	10.00	15.00	23.00	32.00

POWELL UNION COMPOSITE DISC VALVES STEAM BRONZE COMPOSITION



PLATE 7831 GLOBE



PLATE 7832 ANGLE



PLATE 7833 CROSS







	(6)			
ATE	7835	COMPOSITE	DISC	



PLATE 7836 DISC NUT

Size	Inches	1/8-1/4	3 8	1/2	34	1	1 1/4	1 1/2	2	$2\frac{1}{2}$	3
Pl. 7831	Globe Valves	1.10	1.25	1.60	2.20	2.80	4.00	5.50	8.75	15.75	22.00
Pl. 7832	Angle Valves										
Pl. 7833	Cross Valves	1.70	2.00	2.25	2.50	3.25	4.75	6.25	9.50	20.00	27.50
Pl. 7834	Disc Holder	.20	.30	.45	. 60	.75	1.00	1.45	2.15	2.60	3.60
	Composite Disc		.04	.04	.05	.06	.09	.12	.18	. 24	.40
	Soft Metal Disc		.06	.07	.08	.10	.13	.18	.22	.50	.76
Pl. 7835b	Bronze Metal Disc	.14	.14	.16	. 20	.22	.28	.30	.34	. 60	. 8.
Pl. 7836	Disc Nut	.05	.07	.10	.12	.15					. 7.5



POWELL Brass Union Disc Check Valves



PLATE 7837 HORIZONTAL PLATE 78							838	8 ANGLE		
SizoInches	1/4	3/8	1/2	3/4	1	11/4	1 1/2	2	2 1/2	3
Plate 7837 Horizontalea. Plate 7838 Angleea.										

BRONZE GATE VALVES



PLATE 7839 BRONZE GATE VALVE



PLATE 7840 BRONZE HOSE GATE VALVE

BRONZE GATE VALVES

SizeInches	1/4	3/8	$\frac{1}{2}$	34	1	11/4	1 1/2	2	2 1/2	3
Each	1.25	1.25	1.30	1.75	2.50	3.50	5.00	7.50	14.00	20.00

BRONZE HOSE GATE VALVES

Size Inches	3/4	1	11/4	1 ½	2	2 1/2	3
Rough body, finished trim, iron wheel	2.45	3.35	4.70	6.25	9.00	15 00	22 00
Rough body, finished brass cap and chain	3.95						
Rough body, finished trim, brass wheel			6.85				
Finished all over, brass wheel			9.10				
Finished all over, fin. brass cap and chain			11.00				
Finished and N. P. all over, brass wheel		7.50	9.80	12.65	18.30	27.25	39.75
Finished and N. P. all over, with cap and chain	7.20	9.25	11.80	15.25	21.90	32.25	47.25

STANDARD BRASS SAFETY VALVES



PLATE 4731 CROSS, SCREWED

SizeInches								
Cross, Screwed	$\frac{3.25}{3.25}$	3.90 3.90	$\frac{4.70}{4.70}$	7.15 7.15	9.00 9.00	$12.50 \\ 12.50$	$22.50 \\ 22.50$	33.50 33.50

Note—The levers on above valves are graduated from 30 to 100 pounds. Can be furnished graduated under 30 pounds at special price.

LOW PRESSURE SAFETY VALVES



PLATE 4732 WITH BALANCE WEIGHT



PLATE 4733 WITH BALL ON TOP

SizeInches	1/2	3/4	1	11/4	1 1/2	2
With Balance Weight Each Ball on Top Each Ball on Top, Angle Pattern . Each	1 50	7. 7.5	3.00	4.00	0.00	

RELIEF VALVES

SNIFTER, WATER OR CYLINDER



PLATE 5625 MODEL U



PLATE 5626 MODEL UT

A relief valve to be used on cylinders of steam engines to prevent a dose of water from blowing off the cylinder head.

Size	1/2	3/4	1	11/4	$1\frac{1}{2}$
Semi-finished each Finished each Nickel plated each	11.00	10.00 11.00 12.00	12.00 13.00 14.00	15.00 16.00 18.00	18.00 19.00 22.00
Size Inches	2	2 1/2	3	3 1/2	4
Semi-finished. each Finished each Nickel plated each	29.00	43.00 46.00 50.00	72.00 77.00 85.00	95.00 105.00 115.00	120.00 135.00 150.00

POP SAFETY VALVES BRONZE PATTERN FOR MARINE AND STATIONARY BOILERS



PLATE 6740

Size Inche	es 1/2	3/4	1	11/4	1 1/2	2	21/2
Serni-Finished eac Finished eac							



PLATE 6741 SCREWED BASE



PLATE 6742 FLANGED BASE

a.	G. J. C.D.	Diameter of		Capacity, Horse	Reg	ular	Nickel-Seate	
Size, Ins.	Style of Base	Side Outlet, Screwed	of Valves Ins.		Plain	Lock- up	Plain	Lock- up
3 ½ 4 ½ 5 ½	Screwed	3 ins. 3½ ins. 4 ins. 9½ in. Flge. 9 in. Flge. 10 in. Flge.	12 1/4 13 14 16 1/2 18 1/2 22 1/2 25 1/2 25 1/2 27	25 to 40 40 to 75 75 to 100 100 to 125 125 to 150 150 to 175 175 to 200 200 and upwards	$\begin{array}{c} 50.00 \\ 65.00 \\ 80.00 \\ 100.00 \\ 125.00 \\ 160.00 \\ 220.00 \end{array}$	55.00 75.00 90.00 110.00 135.00 170.00 235.00	$\begin{array}{c} 60.00 \\ 77.00 \\ 94.00 \\ 116.00 \\ 145.00 \\ 185.00 \\ 260.00 \end{array}$	$\begin{array}{c} 65.00 \\ 87.00 \\ 104.00 \\ 126.00 \\ 155.00 \\ 195.00 \\ 285.00 \end{array}$

In ordering state pressure to be carried. If flange is desired, state diameter.

STANDARD BRASS STEAM COCKS



PLATE 453 FLAT HEAD



PLATE 454 SQUARE HEAD



PLATE 455 THREE-WAY



PLATE 456 FLANGED

BizeInches	1/4	3/8	1/2	3/4	1	1 1/4	$1\frac{1}{2}$
Flat or Square Heads Male and Female, Fl. or Sq. Heads Both Ends Male, Fl. or Sq. Heads Three-Way Flanged, Flat or Square Heads	1.35 1.75 2.10	$ \begin{array}{r} 1.45 \\ 1.90 \\ 2.10 \end{array} $	$2.00 \\ 2.50 \\ 2.50$	3.25	2.35 3.00 3.50 3.75 7.30	3.70 5.35 6.75 5.75 9.70	4.85 6.75 8.25 7.15 11.75
SizeInches	2	$2\frac{1}{2}$	3	3 1/2	4	5	6
Flat or Square Heads Male and Female, Fl. or Sq. Heads Both Ends Male, Fl. or Sq. Heads Three-Way Flanged, Flat or Square Heads.	$9.85 \\ 12.00 \\ 11.00$	$17.50 \\ 20.00 \\ 18.75$	$25.75 \\ 29.00 \\ 26.00$	50.00	70.00	125.00 150.00	

GAS SERVICE COCKS



PLATE 457 SQUARE HEAD



PLATE 458 FLAT HEAD

SQUARE OR FLAT HEAD

SizeInches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Standardeach Extraeach	.90 1.10	.90 1.10	$\frac{1.00}{1.20}$	1.10 1.30	1.30 1.80	$\frac{2.10}{3.00}$	$\frac{3.25}{4.50}$	$\frac{4.60}{6.50}$	8.00 11.20	17.50 24.50	27.00 37.80



AIR COCKS LEVER HANDLE



PLATE 510 SINGLE THREAD



PLATE 511 DOUBLE THREAD

		1		1	1	-				1	1
Size.Inches	1/8	1/4	3/8	1/2	3/4	Size.Inches	1/8	1/4	3/8	1/2	3/4
Price	. 55	.60	.65	.75	1.05	Price	.70	.80	.90	1.05	1.40



PLATE 512 BIBB



PLATE	513
DOUBLE	FEMALE

SizeInches	1/8	1/4	3/8	1/2
Price,	.85	.95	1.05	1.15

SizeInches	1/8	1/4	3/8	1/2
Price	.80	.85	1.00	1.25



PLATE 514
MALE AND FEMALE

SizeInches	1/8	1/4	3/8	1/2
Price.	.90	.95	1.05	1.20



AIR COCKS



PLATE 505 SINGLE THREAD



PLATE 506 DOUBLE THREAD

1	1				1	1				1	
Size.Inches	1/8	1/4	3/8	1/2	3/4	Size. Inches	1/8	1/4	3/8	1/2	3/4
Price	.40	.45	. 50	. 60	.80	Price	.55	.65	.75	.90	1.25



PLATE 507 BIBB



PLATE 508
DOUBLE FEMALE

1/4

.70

1/2

.85 1.10

	-						
Size.Inches	1/8	1/4	3/8	1/2	3/4	SizeInches	1
Price	.70	.80	.90	1.00	1.35	Price	. 6



PLATE 509
MALE AND FEMALE

SizeInches	1/8	1/4	3/8	1/2
Price	.75	.80	.90	1.05



COMPRESSION GAUGE COCKS



PLATE 515 WOOD WHEEL



PLATE 516
WOOD WHEEL, WITH STUFFING BOX

SizeInches	1/8	1/4	3/8	1/2	34
Wood Wheel Gauge Cock, no Stuffing Box Wood Wheel Gauge Cock, with Stuffing Box, Steam Gauge Cocks, with Union Tee Handles		1 75	.95 1.20	1.00 1.30	1.25 1.45

STEAM GAUGE COCKS.

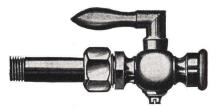


PLATE 517
LEVER HANDLE, WITH UNION



PLATE 518
TEE HANDLE

SizeInches	1/8	1/4
Tee Handle, Female	.60	65
Lever flandle, Male and Female	95	1.00
Lee Handle, Male and Female	90	.85
Lever Handle, with Union	1.50	1.65



HOYT SELF-CLOSING GAUGE COCKS

WITH BABBIT VALVE AND SWIVEL ATTACHMENT



PLATE 5517

This Cock has our improved swivel attachment to set the nozzle either right or left hand as desired. $\frac{1}{2}$ inch and $\frac{3}{4}$ inch, Iron Weight.

Brasseac	a 3.00
Nickeleac	1 4.00

REGISTER GAUGE COCKS



PLATE 5518

Size	nes	3/8	1/2	3/4
Ball Gauge Cock ea	ch	1.00	1.00	1.10

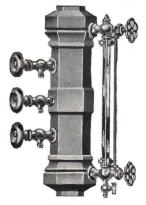
IMPROVED SAFETY WATER COLUMNS

COMBINED HIGH AND LOW WATER ALARMS

ñ	COMBI	NED HIGH ANI	LOW WATE	ER ALARMS
	Size of Col- umns	Kind and Size of Boiler	List Price of Columns with- out Water Gauge and Gauge Cocks	List Price of Water Gauge and Gauge Cocks
	$\frac{1}{5}$	36 to 54 inches 54 to 72 inches	28.00 30.00	7.00
	. 7	Water Tube	35.00	10.00
	9	Vertical	40.00	10.00
	11	Vertical	42.50	12.50
A CONTRACTOR OF THE PARTY OF TH	13	Vertical	45.00	20.00
(1)	15	Vertical	50.00	20.00
0		LOW WATE	R ALARMS	
1/2	2	36 to 54 inches 54 to 92 inches	25.00 28.00	7.00
1	8	Vertical	35.00	$\frac{10.00}{10.00}$
			00.00	10.00

PLATE 5519

WATER COLUMNS



No	1	2	3
Size Water Gauge Openings In.	3/8	1/2	1/2-3/4
Size Gauge Cock OpeningsIn.	3/8	1/2	1/2-3/4
Size Boiler ConnectionIn.	1/2	1	1-1 1/4
Length of ColumnIn.	17	19	19
Center to Center of Water Gauge OpeningsIn.	13	14 ¾	14 ¾
Price, without Trimmings	3.00	5.00	8.00

Brass Columns prices upon application.

PLATE 5696

SELF CLEANING WATER GAUGES

POLISHED BODY

TWO GUARDS

WOOD WHEELS



PLATE 569

The upper and lower arms are each cast in one piece, thus avoiding the joints found in most other makes and prevents the possibility of leaks.

Number	8	9	10
Size Shank. inches Size Glass. inches Price each	5/8 x 12	5/8 x 12 4 25	3 ₄ x 16 5.50

Can be furnished with Iron Wheels if desired.

WATER GAUGES, STEAM METAL



PLATE 882 FOR EXPANSION TANK



PLATE 883
ROUGH BODY, IRON WHEEL



PLATE 884
FINISHED BODY, IRON WHEEL



PLATE 885 FINISHED BODY, WOOD WHEEL



PLATE 886
ROUND BODY FINISHED
FOUR GUARDS



PLATE 887
SQUARE BODY FINISHED
FOUR GUARDS

WHEEL	TOOK GOANDS	TOOK GOARDS	•
	For Expansion Tank		2.60
Plate 883 No. 1,	Rough Round Body, I. W., 5/8x10 in. Glass, 3/8 in.	I. P	2.75
Plate 883 No. 2,	Rough Round Body, I. W., 5/8x12 in. Glass, 1/2 in.	I. P	3.00
Plate 883 No. 3,	Rough Round Body, I. W., 34x16 in. Glass, 34 in.	I. P	4.50
Plate 884 No. 1,	Finished Round Body, I. W., 5/8x10 in. Glass, 3/8 i	n. I. P	3,25
Plate 884 No. 2,	Finished Round Body, I. W., 5/8x12 in. Glass, 1/2 i	n. I. P	3.75
Plate 884 No. 3,	Finished Round Body, I. W., 34x16 in. Glass, 34 i	n. I. P	4.75
Plate 885 No. 1,	Finished Round Body, W. W., 5/8x10 in. Glass, 3/8	in. I. P	3.75
Plate 885 No. 2,	Finished Round Body, W. W., 5/8x12 in. Glass, 1/2	in. I. P	4.25
Plate 885 No. 3,	Finished Round Body, W. W., 34x16 in. Glass, 34	in. I. P	5.50
Plate 886 No. 1,	Finished Round Body, W. W., 5/8x12 in. Glass, 1/2	in. I. P	5.25
Plate 886 No. 2,	Finished Round Body, W. W., 34x16 in. Glass, 34	in. I. P	6.25
Plate 887 No. 1,	Finished Round Body, W. W., 5/8x12 in. Glass, 1/2	in. I. P	6.00
Plate 887 No. 2,	Finished Round Body, W. W., 34x16 in. Glass, 34	in. I. P	8.00



SCOTCH GAUGE GLASSES



PLATE 543

External DiameterInches	1/2	5/8	3/4	7/8	1
Length, 10 inches	3.00	3.00	3.60	5.04	6.12
Length, 11 inches	3.24	3.24	3.96	5.64	6.72
Length, 12 inches	3.60	3.60	4.32	6.12	7.32
Length, 13 inches	3.84	3.84	4.80	6.60	7.92
Length, 14 inches	4.20	4.20	5.16	7.08	8.52
Length, 15 inches	4.44	4.44	5.52	7.56	9.12
Length, 16 inches	4.80	4.80	5.88	8.16	9.72
Length, 17 inches	5.04	5.04	6.24	8.64	10.32
Length, 18 inches	5.40	5.40	6.60	9.12	10.92
Length, 19 inches	5.64	5.64	7.08	9.60	11.52
Length, 20 inches	6.00	6.00	7.44	10.20	12.12
Length, 22 inches	6.60	6.60	8.16	11.16	13.44
Length, 24 inches	7.20	7.20	8.88	12.12	14.64
Length, 30 inches	9.00	9.00	11.16	15.24	18.24
Length, 36 inches	10.80	10.80	13.44	18.24	21.96
Length, 48 inches	14.52	14.52	18.00	24.36	29.16
Length, 60 inches	18.12	18.12	22.56	30.48	36.48
Length, 72 inches	21.84	21.84	27.12	36.48	43.80

Lengths over 24 inches and all 1-inch glasses, special discount.





PLATE 544

PLATE 545

Chesterton Gauge Glass Cutter, Each, 2.00 | Newark Gauge Glass Cutter. Each, 1.00



PLATE 546

RUBBER GAUGE GLASS GAUGE GLASS PRESERVERS GASKETS





Sizes: ½, 5/8, 3/4..... Per Dozen, .60 Packed 1 dozen in each box.Per Doz., .60

GAUGES



PLATE 524
PRESSURE GAUGE



PLATE 525 VACUUM GUAGE

Size Dial Inches	Iron Case Brass Ring	Iron Case N. P. or Sil. Met. Ring	Brass Case	N. P. or Sil. Met. Case	Brass Deep Case O. G. or Oct. Ring	Deep	Alumi- num Case
$\begin{array}{c} 24 \\ 20 \\ 18 \\ 16 \\ 14 \\ 12 \\ 10 \\ 8 \\ 12 \\ 6 \\ 34 \\ 6 \\ 5 \\ 12 \\ 2 \\ 3 \\ 3 \end{array}$	200.00 135.00 110.00 90.00 75.00 32.00 22.00 16.00 13.00 10.00 8.00 7.00 6.00	206.00 140.00 113.00 92.00 76.50 51.50 33.00 22.75 16.60 13.50 10.25 8.20 7.18 6.15	260.00 190.00 155.00 125.00 100.00 75.00 40.00 30.00 20.00 16.00 11.00 10.00 9.00 8.00	280.00 205.00 167.50 135.00 107.50 79.00 32.50 22.00 17.50 13.25 12.00 11.00 9.75 8.60	80.00 44.00 33.50 23.00 18.50 11.50 11.50 10.25 9.25	84,00 47,00 36,00 25,00 20,00 15,00 12,50 11,00 9,75	260,00 190,00 155,00 125,00 100,00 75,00 40,00 30,00 20,00 11,00 11,00 9,00 8,00

 $\label{eq:Pressure and Vacuum Gauges for Steam, Water, Air and Vacuum Pressure. \ \ Prices include Cock.$



GAUGES



PLATE 527 HYDRAULIC GAUGE

PLATE 526 COMBINED PRESSURE AND VACUUM GAUGE

COMBINED PRESSURE AND VACUUM GAUGES

Size Dial Inches	Iron Case Brass Ring	Iron Case N. P. Ring	Brass Case	N. P. Case	Brass Deep Case, O. G. or Oct. Ring	Case, O. G.
12	60.00	61.50	80.00	84.00	85.00	89.00
10	40.00	$\frac{41.00}{30.75}$	50.00 40.00	53.00 42.50	54.00 43.50	57.00 46.00
$\frac{8\frac{1}{2}}{6\frac{3}{4}}$	30.00 20.00	20.60	25.00	27.00	28.00	30.00
6	16.00 14.00	$16.50 \\ 14.25$	20.00 16.00	$21.50 \\ 17.25$		
$\frac{5}{5}^{1/2}$	14.00	14.25	16.00	17.25		
4 1/2	12.00	12.20 10.18	14.00 12.00	$15.00 \\ 12.75$		

HYDRAULIC GAUGES

Size Dial Inches	Iron Case Brass Ring	Iron Case N. P. or Sil. Metal Ring	Brass Case	N. P. or Sil. Met. Case	Aluminum Case
12	110.00	111.50	125.00	129.00	125.00
	90.00	91.00	100.00	103.00	100.00
$\frac{10}{8\frac{1}{2}}$	70.00	70.75	80.00	82.50	80.00
	50.00	50.60	60.00	62.00	60.00
$\frac{634}{6}$	35.00	35.50	40.00	41.50	40.00
	30.00	30.50	35.00	36.00	35.00
$\frac{5}{4\frac{1}{2}}$	25.00 22.00	25.50 22.50	30.00 26.00	$\frac{31.00}{26.75}$	30.00 26.00



STEAM GAUGE SYPHONS BRASS AND IRON

PLATE 528

Size Pipe ThreadInches	1/4
IroneachBrass, FinishedeachBrass, Nickel-Platedeach	1.00

A syphon should be used in connecting Steam Gauge. Before connecting Gauge, first fill Syphon with water, thus preventing the steam from coming in contact with spring of Gauge. No Steam Gauge is warranted unless connected with Syphon.

ALTITUDE GAUGES



PLATE 5259

These gauges will indicate accurately, at the boiler, the height of water in the

These gauges will indicate accurately, at the boiler, the height of water in the system, and will be found very useful instruments.

Explanation: When the water is at its proper level in expansion tank, remove the ring and glass, and set the stationary hand at the pressure indicated by the working hand; whenever the pressure falls below this point, water should be added. Iron case with nickel-plated rim; including cock.

RECORDING PRESSURE AND VACUUM GAUGES



PLATE 5260 ORIGINAL FORM, MODEL 10



PLATE 5261 ROUND FORM, MODEL 60

For all ranges of pressure and vacuum from full vacuum to 20,000 lbs. per square inch. Furnished for use on air, steam and liquids with charts graduated in many different units, such as pounds, ounces, inches and metric units.

Original Form, Model 10, 12 inch charts	60 00
Original Form, Model 10. 8 inch charts	50 00
Round Form, Model 60, 10 inch charts	40 00
Round Form, Model 60, 8 inch charts	30.00

REVOLUTION COUNTERS



PLATE 5262

Size	Figures	Counting	Plain	Resetting
4 ½ x 1 ¾ in. 5 x 1 ¾ in. 5 ½ x 1 ¾ in. 6 x 1 ¾ in. 7 x 2 ½ in. 8 x 2 ½ in. 9 x 2 ½ in. 10 x 2 ½ in.	4 5 6 7 4 5 6	10,000 100,000 1,000,000 10,000,000 10,000 100,000 1,000,000	17.50 20.00 24.00 28.00 20.00 24.00 28.00 32.00	21.50 24.00 28.00 32.00 24.00 28.00 32.00 36.00

THERMOMETERS







PLATE 5264

		Per Dozen
Plate 5263	Straight Thermometer, for Hot Water	36.00 42.00



STEAM WHISTLES AND WHISTLE VALVES



PLATE 592 PLAIN WHISTLE



PLATE 593 WHISTLE WITH VALVE



PLATE 594



PLATE 595

WHISTLES WITH VALVE-ADJUSTABLE LEVER.

Diam. of Bell.	1	11/4	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	3 1/2	4	5	6	8.	10
Size Pipe			1/2	3/4	3/4	1	1	1 1/4	1 1/2	2	21/2	21/2
Each	3.10	3.75	4.00	5.50	6.50	8.50	11.50	15.00	22.50	33.00	95.00	210.00

PLAIN WHISTLES-WITHOUT VALVE.

Diam. of Bell.	1	1 1/4	1 1/2	2	21/2	3	3 1/2	4	5	6	8	10
Size Pipe:	1/2	1/2	1/2	3/4	3/4	1	1	1 1/4	1 1/2	2	21/2	21/2
Each	2.20	2.75	3.00	4.35	5.25	7.25	9.50	12.00	19.00	24.00	70.00	150.00

WHISTLE VALVES

Size	1/2	3/4	1	1 1/4	$1\frac{1}{2}$	2	21/2	3
Each	2.50	3.00	3.50	5.00	6.00	9.00	18.00	27.00



STEAM SIREN.

Size Number	1	2	3	4	5	6
Connection Inches	3/4	1	11/4	1 ½	2	21/2
Bellmouth	15.00	22.00	30.00	40.00	65.00	110.00
Fixed Cowl	20.00	27.00	35.00	45.00	75.00	125.00
Movable Cowl	25.00	32.00	40.00	50.00	85.00	145.00
Geared Cowl						1

PLATE 596

CHIME WHISTLES



PLATE 5691 WITH SIDE VALVE



PLATE 5692 WITHOUT VALVE



PLATE 5693 LOCOMOTIVE STYLE WITH UPRIGHT VALVE

Bell DiamInches	11/2	2	21/2	3	3 1/2	4	5	6	8	10	12
Pipe ConnInches	3/8	-	1	3/4	1	1	11/4	$1\frac{1}{2}$	2	2 1/2	3
Semi-finished with valveeach	6.00			11.00	15.00	18.00	28.00	42.00	100.00	200.00	290.00
Semi-finished with- out valveeach											
Semi-finished Loco- styleeach		V.	1		1	L.				1	1



MOCKING-BIRD WHISTLES

Diameter of Bells.Inches	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	5	6
Size of Pipe Connection, Inches	3/4	3/4	1	11/4	1 ½	1 1/2
All Br., with Valve Ea.	10.50	14.00	20.00	28.00	40.00	56.00
All Br., without Val. Ea.	9.00	12.00	17.50	25.00	37.00	50.00
I. B., without ValEa.		11.50	16.50	23.00	34.00	46.00

PLATE 5694 ALL BRASS, WITH VALVE

BRASS OIL CUPS



PLATE 7841 PLAIN



PLATE 7842 ELBOW SHANK



PLATE 7843 THANDLE



PLATE 7844 LEVER HANDLE

Diameter Inches	5/8	3/4	7/8	1	11/4	11/2	13/4	17/8	2	21/4	21/2
Size thread inches Plain each Elbow shank each T handle each Lever handle each	. 55	1/8 .30 .65 .80	1/8 .35 .75 .90 1.00	85	1.60 1.00 1.50 1.60	1 40	1 80	9 15	9 40	$\frac{1/2}{2.25}$ $\frac{3.00}{3.75}$ $\frac{4.00}{4.00}$	9 00



PLATE 7845 LOCOMOTIVE



PLATE 7846



PLATE 7847 SMALL BASE -HINGED LID- LARGE BASE

Diameter Inches	5/8	3/4	7/8	1	11/4	11/2	1 3/4	1 7/8	2	21/4	21/2
Size thread. inches Locomotive each Hinged lid each	.70	1/8 .85	1.05 .70	1,25 .85	1.50 1.20	$\frac{3}{8}$ 1.90 1.60	$\frac{3}{8}$ 2.40 2.10	$\frac{3}{8}$ 2.80 2.50	$\frac{1}{2}$ $\frac{3.30}{2.70}$	$\frac{1}{4.30}$	$\frac{1/2}{5.00}$

GLASS OIL CUPS



PLATE 7848 PILGRIM



PLATE 7849 PURITAN



PLATE 7850 SIGNAL



PLATE 7851 PLANET

Number	00	0	1	1 1/2	2	3	4	5	6
Diameter of glass inches	1	11/4	11/2	$\begin{array}{c} 1\frac{3}{4} \\ 1\frac{5}{8} \\ \frac{3}{8} \\ 1\frac{1}{2} \\ 1.25 \end{array}$	2	21/4	21/2	3	3 1/6
Height of glassinches	7/8	11/8	13/8	15/8	1 7/8	21/8	23%	3	$\frac{3\frac{1}{2}}{4}$
Size of threadinches	1/8	1/4	1/4	3/8	3/8	3/8	1/2	1/2	1/9
Capacityounces	1/3	5/8	1	11/2	21/2	4	51/3	8	16
Pilgrim, finishedeach	.75	.80	1.00	1.25	1.50	1.90	2.40	3.10	4.00
Pilgrim, nickel plated each	.85	.95	1.20	1.50	1.75	2.20	2.75	3.50	4.50
Puritan, finishedeach	1.10	1.25	1.50	1.75	2.10	2.55	3.15	3.90	4.80
Puritan, nickel plated each	1.20	1.40	1.75	2.10	2.35	2.85	3.50	4.30	5.30
Signal, finishedeach		3.00	3.25	3.50	3.75	4.25	5.25	7.25	9.25
Signal, nickel platedeach		3.50	3.75	4.00	4.25	4.75	5.75	8.00	10.25
Planet, finishedeach		1.35	1.60	1.80	2.30	2.75	3.75		
Planet, nickel plated each		1.75	2.05	2.30	2.80	3.35	4.45		

The Planet oil cup is constructed with a plunger feed valve and is especially for use on crank or wrist pins.



PRIMING CUPS



PLATE 7852 T HANDLE



PLATE 7853 LEVER HANDLE



PLATE 7854 LEVER HANDLE ELBOW SHANK



PLATE 7855 SLOTTED LEVER HANDLE

DiameterInches	5/8	3/4	1	1	11/8	1 1 1/4
Size thread	1/8 .70 .75 .85 .95	1/8 .80 .85 1.00 1.15	1/8 .90 .95 1.15 1.30	1/4 1.00 1.10 1.35 1.50	1/4 1.30 1.40 1.60 1.75	$\frac{3}{8}$ 1.50 1.65 1.90

GLASSES AND WASHERS



PLATE 7856 CYLINDRICAL GLASS



PLATE 7857 URN-SHAPED GLASS

Number	000	00	0	1	$1\frac{1}{2}$	2	3	4	5	6	8
Diameter cylinder glass inches Height cylinder glass inches Diam. urn-shaped glass inches Height urn-shaped glass inches Glasses each Cork washers per doz.	7/8 	$\begin{array}{c} 1\frac{1}{8} \\ 1 \\ 1\frac{1}{8} \\ 1\frac{1}{2} \\ .06 \\ .18 \end{array}$	$1\frac{1}{4}$ $1\frac{1}{8}$ $1\frac{1}{4}$ $1\frac{5}{8}$ 08 08	$\begin{array}{c} 1\frac{1}{2}\\1\frac{3}{8}\\1\frac{1}{2}\\2\\.10\\.30\\\end{array}$	$\begin{array}{c} 1\sqrt[3]{4} \\ 1\sqrt[5]{8} \\ 1\sqrt[3]{4} \\ 2\sqrt[1]{4} \\ .10 \\ .36 \end{array}$	2 1 ⁷ / ₈ 2 2 ¹ / ₂ .12 .40	2 ½ 2 ½ 2 ½ 2 ¼ 2 ¾ 2 ¾ .15 .45	2½ 2¾ 2½ 3½ 3½ .25	3 3 3 3.5% .35 .60	$ \begin{array}{c} 3\frac{1}{2} \\ 4 \\ 3\frac{1}{2} \\ 4\frac{1}{2} \\ .65 \\ .75 \end{array} $	4 ½ 5 1.50 1.50



GREASE CUPS







PLATE 7859 PREMIUM BRASS GREASE CUP

EMPRESS STEEL GREASE CUPS

Number	000	00	0	1	2	3	4	5
Inside diameterinches	3/4	1	11/4	11/2	2	21/2	3 ·	31/
Size threadinches	1/8	1/8	1/4	1/4	3/8	1/2	1/2	3/4
Capacityounces	1/4	1/2	2/3	1	2	$3\frac{1}{2}$	5	8
Finished each	.40	. 50	. 65		1.05			
Blued finish each		. 65	.80		1.25			
Nickel plated each	. 60	.70	. 90	1.10	1.45	2.00	2.80	4.0

PREMIUM BRASS GREASE CUPS

Number	00	0	1	2	3
Inside diameterinches	1	11/4	11/2	2	21/2
Size thread inches Capacity ounces	1/8	1/4 2/2	14	3/8	3 1/2
Rougheach	.56	.74	.96	1.28	1.76
Finishedeach Nickel platedeach	.70	1.06	$\frac{1.15}{1.36}$	$\frac{1.50}{1.80}$	$\begin{vmatrix} 2.15 \\ 2.60 \end{vmatrix}$



PLATE 7860 ACTIVE AUTOMATIC BRASS GREASE CUPS

Number	00	0	1	2	3	4
Inside diameter inches Size thread inches Capacity ounces Finished each Nickel plated . each	1 1/8 1/3 1.50	$ \begin{array}{c c} 1\frac{1}{4} \\ \frac{1}{4} \\ 1 \\ 2.00 \\ 2.25 \end{array} $	$ \begin{array}{c c} 1\frac{1}{2} \\ \frac{1}{4} \\ 1\frac{1}{2} \\ 2.50 \\ 2.80 \end{array} $	2 3/8 3 3.20 3.60	$2\frac{1}{2}$ $\frac{1}{2}$ 6 4.30 5.00	$ \begin{array}{c} 3 \\ \frac{1}{2} \\ 10 \\ 6.00 \\ 6.75 \end{array} $



PLAIN BRASS LUBRICATOR



PLATE 5440

No	00	0	1	2	3	4	1 5	1 6	1 7	1.8
Diameterinches	1	11/4	1 1/2	1 34	2	21/4	21/2	3	3 1/2	4
Capacityounces Pipe Threadinches	3/8	3/8	3/8	1 ½ 3/8	$\frac{2\frac{1}{2}}{\frac{1}{2}}$	$\frac{4}{\frac{1}{2}}$ 3.25	5	10	18	24
Plaineach With Drain Cock and		2.20	2.40	2.60	2.90		3.75	4.75	7.00	10.0
Tubeeach	3.00	3.20	3.40	3.60	3.90	4.25	4.75	5.75	8.00	12.0

GLASS BODY OIL PUMP



PLATE 5441

Our Glass Body Oil Pump is very widely used as an auxiliary to the sight feed lubricator on stationary and marine engines. They are of superior design, finish and workmanship, and will feed oil against very high pressure. Each oil pump is carefully tested and is guaranteed to operate perfectly.

No	507	508	509	510
Capacity. Glass Diameter . inches Glass Height . inches Shank Pipe Thread . inches	4 oz. 2 3/8 2 1/4	10 oz. 3 ½ 3 ½ 3 ½ 1 ½	1 pt. 3½ 4	1 qt. 4½8 5½8
Brass Finish	$7.50 \\ 8.50$	$10.00 \\ 11.25$	$12.00 \\ 13.50$	16.00 18.00



DETROIT IMPROVED SIGHT FEED STANDARD LUBRICATOR

DOUBLE CONNECTION

PLATE SEA

Size	For Cylinder	Brass Finish	Nickel Finish	Pipe Thread on Support Arm
1/3 Pint 1/2 Pint 1 Pint 1 Quart 1/2 Gallon 1 Gallon	Under 10 inches 10 to 12 inches 12 to 18 inches 18 to 30 inches 30 inches and over	17.00 22.00 30.00 45.00 60.00 75.00	20.00 25.00 35.00 50.00 65.00 80.00	½ inch ½ inch ½ inch ½ inch ¾ inch ¾ inch

DETROIT SINGLE CONNECTION LUBRICATOR

For Traction Engines, Portable Engines, Steam Pumps, etc.

Can be connected to either Horizontal or Vertical Steam Pipe, or Perpendicularly into the Steam Chest.



PLATE SEE

Size	Brass	Nickel	Pipe Thread on
	Finish	Plated	Support Arm
14 Pint. 15 Pint. 12 Pint. 1 Pint. 1 Quart.	15,00 17,00 20,00 28,00 42,00	18.00 20.00 23.00 32.00 47.00	1/2 inch 1/2 inch 1/2 inch 1/2 inch 1/2 inch 1/2 inch



LEADER INJECTORS

DOUBLE TUBE



PLATE 8092

	1	Pipe Co	onnections,	Inches	Cap	acity
No.	Price, Each	Steam	Suction	Feed	Horse Power	Per Hour 60 lb Steam Pressure Gallons
1	16.00	3/8	3/8	3/8	3 to 7	60
2	18.00	3/8	3/8	3/8 3/8	7 to 10	90
2 3 4 5 6	22.00	3/8 3/8 1/2 1/2 3/4 3/4 3/4 3/4	3/8 3/8 1/2 1/2 1/2 3/4 3/4		12 to 18	150
4	25.00	1/2	1/2	1/2 1/2 3/4 3/4	18 to 25	220
5	30.00	3/4	3/4	3/4	25 to 35	300
6	35.00	3/4	3/4	3/4	35 to 45	400
7	40.00	3/4	1	1	45 to 60	500
8	45.00	3/4	1	1	60 to 70	600
9	55.00	1	11/4	1 1/4	70 to 90	750
10	65.00	1	11/4	1 1/4	100 to 125	1000
11	75.00	1 1/4	1 1/2	$1\frac{1}{2}$	125 to 150	1300
12	90.00	1 1/4	1 1/2	$1\frac{1}{2}$	150 to 200	1800

Every injector is tested and fully guaranteed.

The leader injector consists of three machines in one; a perfect boiler feeder, a syphon or ejector, and a scale solvent feeder.

As a perfect boiler feeder. It forces the water into the boiler instantly without spilling or dribbling at the overflow; one movement of the lever starts or stops it and handles the water at a high temperature. Requires no complicated fittings to attach to the boiler and no valve in the suction pipe when water is lifted. The lower tubes do the lifting and the upper tubes the forcing.

As a syphon or ejector. When the lever is not in position for feeding and steam is turned on, it discharges the water at the overflow in a solid stream and at a low temperature.

As a scale solvent feeder. After the injector is started and the lever is brought to a vertical position, a suction is created in the overflow through which boiler compound or any liquid scale solvent can be fed into the boiler, atomizing and distributing it all over the shell and tubes.

Scale and other deposits can be removed quickly from the forcing tubes of the injector by means of a drill and wrench, without disconnecting it from the boiler.



U. S. AUTOMATIC INJECTOR

REGULAR STYLE

ADAPTED TO EITHER SIDE OF BOILER



PLATE 5690

Size Price		Pipe Connec- tion	Horse Power Based on Ordi- nary Tub. Boiler		Capacity per Hou 1 to 3 feet Lift, Steam Pressure 60 to 80 lbs.		
				per hour	Max.	Min.	
00	13.00	1/4	1 to 3	1 to 4	36	20	
0	14.00	3/8	3 to 6	4 to 8	65	35	
1	16.00	3/8	4 to 8	6 to 12	90	55	
2	18.00	1/2	8 to 16	10 to 20	135	65	
3	20.00	1/2	12 to 22	15 to 30	180	100	
4	25.00	14/8/8/8/8/9/02/4/4	17 to 32	22 to 45	260	140	
5	30.00	3/4	20 to 45	25 to 60	355	170	
1 2 3 4 5 6 7 8 9	40.00	1	40 to 65	45 to 80	475	300	
7	45.00	1	45 to 80	50 to 100	600	350	
8	55.00	1 1/4	50 to 100	60 to 135	800	425	
9	60.00	1 1/4	75 to 135	85 to 165	1000	525	
10	75.00	1 1/2	100 to 180	125 to 235	1400	800	
11	90.00	1 1/2	115 to 255	150 to 320	1900	950	
12	110.00	2	160 to 320	200 to 380	2400	1300	
13	125.00	2 2 2	200 to 400	250 to 500	3000	1600	
14	150.00	2	300 to 500	325 to 550	3600	2000	
15	175.00	$2\frac{1}{2}$	350 to 550	400 to 600	4000	2200	
16	200.00	2 1/2	400 to 600	500 to 750	4500	2500	



PENBERTHY AUTOMATIC INJECTORS

Horse-power	Con- nec- tions, Ins.	Cap'cty per Hr., Max.	Price
3 to 6	1/4	60	15.00
	1/6		16.00 18.00
12 to 22	1/3		20.00
17 to 32	37	260	25.00
20 to 45	34	360	30.00
	1		40.00
	1		45.00
			55.00
	1 1/4		60.00
			75.00
			90.00
	2 .		110.00
	2		125.00
	2 1/2		150.00 200.00
	3 to 6 4 to 8 8 to 16 12 to 22 17 to 32	Horse-power nections, Ins. 1	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$



PLATE 8093

GARFIELD EJECTORS

PRICE LIST AND CAPACITY, INCLUDING STRAINER



PLATE 8094

	Iron I	Pipe Conne	ections	Capacity	Diam.	
No.	Steam Inches	Suction Inches	Delivery Inches	Gallons per Hour	of Well in Inches	Price
1	3/8	3/2	1/2	300	214	8.00
3	1/2	1 1/4	1 %	500 800	$\frac{2\sqrt[3]{4}}{3}$	$10.00 \\ 15.00$
5	1 3/4	$\frac{1}{2}^{\frac{1}{2}}$	1 1/4	1300 2000	$\frac{31_{2}}{41_{4}}$	$20.00 \\ 25.00$
6	1 1/4	$\frac{21/2}{3}$	2 1/2	3000 5000	5	35.00 50.00
8	1 1/2	3	21/2	6500	6	60.00

The above capacities are secured from actual tests made on 6 foot lift and 20 foot elevation with 60 pounds of steam.



McDaniel Suction Tee

PATENTED



PLATE 612

STANDARD TEES, 100 LBS. PRESSURE.

SizeInches	$\frac{1}{2}$	3/4	1	1 1/4	1 1/2	2	21/2	3
Price	.80	.80	1.00	1.25	1.50	2.00	3.00	4.50

EXTRA HEAVY TEES, 250 LBS. PRESSURE.

SizeInches	1	11/4	$1\frac{1}{2}$	2	2 1/2	3	3 1/2	4	5	6
Price	2.00	2.50	3.00	4.00	6.00	9.00	12.00	15.00	24.00	34.00

McDaniel Syphon and Water Lifter

PATENTED



PLATE 613

DESCRIPTION OF CUT.

A, Suction Pipe. B, Steam Connection. C, End of Cone, or Steam Delivery. E, Discharge.

No.	Diameter of Pipes, in Inches			Capacities	s per Hour	Steam at 50 Lbs. Syphon near Water Level			
*	Suction	Dis- charge	Size St'am Pipe to Use	Gallons,	Cubic Ft.	Size, Inches	Price		
0 1 2 3 4 5 6	34 1 1 14 1 1/2 2 2 1/2 3	34 1 1 1/4 1 1/2 2 2 1/2 3	3/8 1/2 3/4 3/4 1 1 1/4 1 1/2	400 700 1100 1600 3000 5000 7000	52 90 140 210 400 660 980	3/4 1 1 1/4 1 1/2 2 2 1/2 3	5.00 6.00 8.00 10.00 12.00 20.00 25.00		

ENGINE GOVERNORS



PLATE 5737 CLASS "A"



PLATE 5738 CLASS "B"

STANDARD CLASS "A" GOVERNORS

Size of Governor Diam. of OpeningInches	1 1/4	1 ½	2	21/4	2 ½	3	3 1/2	4
Class "A"—Plain each Class "A"—Finished each								
Size of Governor Diam. of OpeningInches	4 ½	5	6	7	8	9	10	12
Class "A"—Plain each Class "A"—Finished each								

STANDARD CLASS "B" GOVERNORS

Size of Governor Diam. of OpeningInches	1 1/4	1½	2	21/4	2 ½	3	3 1/2	4
Class "B"—Plaineach Class "B"—Finishedeach	$\frac{21.00}{24.00}$	25.00 29.00	30.00 34.00	35.00 40.00	40.00 45.00	50.00 58.00	60.00 69.00	71.00 81.00
Size of Governor Diam. of OpeningInches	4 ½	5	6	7	8	9	10	
Class "B"—Plain each Class "B"—Finished each	83.00 94.00	94.00 106.00	122.00 136.00	150.00 166.00	185.00 202.00	215.00 235.00	$240.00 \\ 260.00$	

In ordering, state whether Plain or Finished is desired.



CLIMAX CELLAR **DRAINERS**



PLATE 8095 AUTOMATIC

PLATE 8096 NON-AUTOMATIC

Number	1	2	3	4	5	6
Supply pipe inches	1/2	3/4	1	11/4	$\frac{1}{2}\frac{1}{2}$	2
Discharge pipeinches	1	1 1/4	1 1/2	2	2 1/2	3
Capacity per hourgallons	50 to	100 to	150 to	200 to	275 to	350 to
5	250	400	600	800	1000	1200
Lift fee.	6 to 12	6 to 12				
Pressure pounds	15 to 80	15 to 80				
Price, with automatic movement each	25.00	40.00	55.00	80.00	110.00	160.00
Price, without automatic movement "	15.00	25.00	35.00	50.00	70.00	100.00



PENBERTHY CELLAR DRAINERS

Capacities given below represent actual gallons of water removed from pit, and not the combined discharge of operating and drainage water.

All parts except strainer are brass and all working parts except the float are above water, making them free from slime or corrosion.

A foot valve in the strainer seals the suction pipe when the drainer stops working, holding the water in all the pipes, so that it is always primed ready to start instantly. It also prevents flooding of cellar if for any reason the water pressure is insufficient to operate the ejector.

No leather washers used, leather dries and causes leaks.



PLATE 8097 AUTOMATIC

NON-AUTOMATIC

Number	1	2	3	4	5	6	7	8	
Supply pipei	nches	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Discharge pipei	nches	1	1 1/4	1 1/2	2	21/2	3	3 1/2	4
Gallons per hour	min.	115	180	310	450	600	780	1000	1250
20 to 80 lb. pressure	}			-					
3 to 8 foot elevation	max.	650	1050	1650	2400	3200	4200	5300	6500
Automatic	each	25.00	40.00	55.00	80.00	110.00	160.00		300.00
Non-automatic	each	15.00	25.00			70.00			

PRESSURE REGULATOR







PLATE 4763 No. 1. WITH DASHPOT

HO. O. WILLIOUS DAG	Ho. C. Willion Bachiel							
SizeInches	$\frac{1}{2}$	3/4	1	11/4	1 1/2	2	2 1/2	3
No. 0. Without Dashpot No. 1. With Dashpot	20.00 25.00	20.00 25.00	22.00 27.00	$\frac{24.00}{29.00}$	25.00 30.00	30.00 36.00	$\frac{35.00}{42.00}$	40.00 48.00
SizeInches	$3\frac{1}{2}$	4	5	6	7	8	10	12
No. 0. Without Dashpot No. 1. With Dashpot	50.00 58.00	60.00	75.00 90.00	100.00 120.00	135.00 160.00	175.00 200.00	275.00 300.00	400.00 435.00

MUELLER'S WATER PRESSURE REGULATOR

PATENTED



DI	A	~	-	A	7	6	'n

FERTE							
SizeInches	$\frac{1}{2}$	3/4	1	11/4	11/2	2	21/2
For Iron Pipe each For Lead Pipe each	10.00 10.50	10.00 10.50	13.00 13.70	17.50	24.00	40.00	55.00



PRESSURE REGULATING VALVES

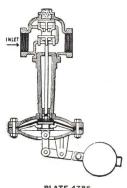


PLATE 4786 CLASS "A"

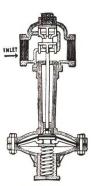


PLATE 4787 CLASS "B"



PLATE 4788 CLASS "C"

CLASS "A" OR "B"

SizeInches	$\frac{1}{2}$	3/4	1	11/4	1 1/2	2	2 1/2	3
Brass, Screwed. each Brass, Flanged. each Iron, Screwed. each Iron, Flanged. each						38.00	48.00 36.00	
SizeInches	$3\frac{1}{2}$	4	5	6	7	8	10	12
Brass, Screwed each Brass, Flanged each Iron, Screwed each Iron, Flanged each	$80.00 \\ 55.00$	$98.00 \\ 65.00$	85.00	115.00	155.00	190.00		

CLASS "C"

Size Inches	1 x 2	$ 1\frac{1}{4}x2\frac{1}{2} $	1½x3	2	x 4	2	½x5	3	x	6	4	x	8	5	X	10	6	x	12
Brass, Screwed each		40.00	60.00																
Brass, Flanged each Iron, Screwed each		52.00	55.00	65	.00	8	5.00	11	5.	00	17	5	00	2:	30	00	30	5	00
Iron, Flanged each			60.00	70	.00	9	0.00	12	0.	00	18	0	.00	24	10	.00	32	0	.00



SPRING REDUCING VALVE

FOR STEAM PUMPS, ENGINES AND STEAM VESSELS.

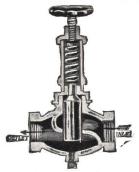


PLATE 727

SizeInches	3/4	1	11/4	11/2	2
Price	14.00	17.00	22.00	28.00	38.00

LEVER REDUCING VALVE

FOR STEAM HEATING OR OTHER PLACES REQUIRING LOW PRESSURE.

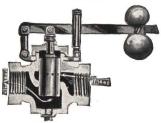


PLATE 728 FOR STEAM ONLY

ALL BRASS MADE-SCREWED ENDS

SizeInches	1/2	1	11/4	11/2	2
Price	14.00	17.00	22.00	28.00	38.00

IRON BODY-FLANGED ENDS

SizeInches	2	$2\frac{1}{2}$	3	4	5	- 6
Price	38.00	55.00	70.00	90.00	110.00	150.00

AUSTIN STEAM SEPARATORS FOR ELIMINATING WATER FROM LIVE STEAM AND INSURING THE DELIVERY OF DRY, EXPANSIVE STEAM TO THE CYLINDERS





PLATE 3560 VERTICAL

PLATE 3561 HORIZONTAL

VERTICAL	SEPA	RATO	RS-I	RON			
SizesInches	1 1/2	2	$2\frac{1}{2}$	3	3 1/2	4	4 1/2
Opening	Screwed	Ends	7	7 ½	8 1/2	9	91/4
Heighth	11	11	13	151/4	163/4	18	20
Width	7	7	8	9	10	11	12
Prices	30.00	40.00	45.00	50.00	60.00	70.00	75.00
Sizes	. Inches	5	6	7	8	10	12
Opening		10	11	12 ½	13 ½	16	19
Heighth		22 1/4	251/4	28 1/2	31 ½	37	40 1/4
Width		13	15	17	19	23	251/2
Prices		80.00	110.00	125.00	160.00	220.00	250.00

Include Companion Flanges, Water Gauge, Nipple and Straight-Way Valve.

HORIZONTA	L SEF	PARA	TORS	-IRO	N		
SizesInches	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2
Opening	Screwed	Ends	7	7 1/2	8 1/2	9	9 1/4
Width	9	9	13 1/4	151/4	16	181/4	19 1/4
Heighth	9	9	12	13	14	15	17
Prices	30.00	40.00	45.00	50.00	60.00	70.00	75.00
SizesInches	5	6	7	8	10	12	14
Opening	10	11	12 ½	13 ½	16	19	21
Width	20 3/4	24 1/4	271/4	30 1/4	31	36	39
Heighth	20 3/4	22	25	29	36	40	42
Prices	80.00	110.00	125.00	160.00	220.00	250.00	300.00

Include Companion Flanges up to 12 in., Water Gauge, Nipple and Straight-Way Valve.

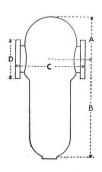
AUSTIN SPECIAL OIL SEPARATORS



PLATE 5279 HORIZONTAL FIGURE Prices on application.

IRON RECEIVER SEPARATOR HORIZONTAL





PI	ΔT	F	5	2	8	0

10 12 14						
	10	8	7	6	5	1 1/2
	20	16	13 3/4	12	11	0
	38 30	32	$\frac{29}{22\frac{3}{4}}$	26 21	23 19	$\begin{array}{c c} 0 \\ 6 \frac{1}{4} \end{array}$
6 19 21	16	13 1	12 1/2	11	10	91/4

PLATE 5281

SizeInches	2	21/2	3	3 1/2	4	4 1/2	5	6	7	8	10	12	14
A B	5 10	6 12 11	61/2	15	9	$10 \\ 20 \\ 16 \frac{1}{4}$	11 23 19	12 26 21	$13\frac{3}{4}$ 29 $22\frac{3}{4}$	32	20 38 30	$\frac{23}{41}$ $\frac{34}{34}$	26 44 39 3/4
D Standard	Screwed Ends	7	71/2			91/4		11	12 1/2			19	21
D Extra Heavy.	Screwed Ends	7 1/2	81/4		10	10 1/2					17 1/2	20	$22\frac{1}{2}$

Prices on application.

SWARTWOUT OIL SEPARATORS



PLATE 5522
VERTICAL OIL SEPARATOR
SIZES 12 INCH AND SMALLER



PLATE 5523
HORIZONTAL OIL SEPARATOR
SIZES 10 INCH AND SMALLER

						2	Siz	ze	C	of	P	iŗ	e	,	ln	cl	ne	S							Star		d Horiz Гуре	ontal	Stand Down-			
11	6.																									:	35.00			35	.00	
2	-				 				into.	-															le .	2	45.00			45	.00	
21	6	•	•																								50.00				.00	
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7																										15	35.00			135	00	
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3		٠						ŭ t				· ·	¥				¥T		¥		v.				1		25.00			425		
3								4 8																	1	50	00.00			500	.00	
)		Ŷ.					7						2													60	00.00			600	.00	

Prices include Water Gauge, Drip Valve, Nipple and Companion Flanges and Bolts on sizes 12 inches and smaller. On sizes 14 inches and larger an extra charge will be made for Companion Flanges.

WE GUARANTEE that when the engine is properly lubricated, the "Swartwout" Oil Separator will so thoroughly remove the Oil from Exhaust Steam, that as steam or water of condensation it may be used for heating water by direct contact, feeding boilers and the like. If it fails to perform this service, it may be returned and full credit will be given.

SWARTWOUT STEAM SEPARATORS



PLATE 5524 VERTICAL STEAM SEPARATOR



PLATE 5525
HORIZONTAL STEAM SEPARATOR

These Separators are manufactured in a variety of designs which make it simple to install them without additional bends in the steam piping. In all types the Chambers are exceedingly large; shaking or vibration of pipes due to modern closing of steam valves is thereby avoided. There is an entire absence of baffleplates or other obstructions to the flow of steam—there is absolutely "nothing simpler." Separation is positive.

All Horizontal Separators are provided with eye bolts to facilitate installation.

SWARTWOUT VERTICAL AND HORIZONTAL STEAM SEPARATORS

Size in Inches	For 125 lbs. Working Pressure I A. S. M. E. Flanges and Drilling	For 250 lbs. Working Pressure "High Pressure" Flanges and Drilling
1	20.00	20.00
1 1/2	25.00	25.00
2	35.00	35.00
2.1/2	45.00	45.00
3	50.00	50.00
31/6	60.00	60.00
2 ½ 2 ½ 3 ½ 4	70.00	70.00
116	80.00	80.00
5 72	95.00	95.00
4 ½ 5 6	120.00	120.00
7	140.00	140.00
Q	175.00	175.00
10	250.00	250.00
10 12	300.00	300.00

Prices include Water Gauge, Drip Valve, Nipple and Companion Flanges and Bolts on sizes 12 inches and smaller. On sizes 14 inches and larger an extra charge will be made for Companion Flanges.

OUR GUARANTEE—Any "Swartwout" Steam Separator will be sent to any responsible user subject to the guarantee that it shall be satisfactory in every respect, otherwise it may be returned, and full credit will be given and freight paid both ways.



EXHAUST HEADS



PLATE 7864	BURT	В	URT	EXHA	UST	HE	ADS	PLATE	7865	LYMAN
Size			Inche	s 1 or 1	2 2 or	21/2 3	or 3½	4 or 41/2	5	6
Price				. 8.00	10.	00	12.00	16.00	20.00	24.00
Size				.Inches	7		8	9	10	12
Price					30.00	3	6.00	42.00	50.00	60.00
		LY	MAN	EXHA	UST	HE	ADS			
SizeInches	1 1	1/2 2	121/2	3	3 1/2	4	4 1/2	5	6 7	8
Price 2	0.00 20	.00 25.	00 25.0	0 30.00	30.00	10.00	46.00	50.00 60	.00 75.0	00.00
SizeInches	9	10	11	12	13	14	15	16	17	18
Price	105.00	125.00	150.00	150.00	175.00	200.0	00 235.	00 250.0	0 270.00	300.00

SWARTWOUT EXHAUST HEADS







PLATE 7867 GALVANIZED

CASI IR	ON	JR G	ALVA	MIZEL) 516	CL		
Size of Exhaust PipeInches	1-1 1/2	2-21/2	3-3 1/2	4-4 1/2	5	6	7	8
Price each	20.00	25.00	30.00	40.00	50.00	60.00	75.00	90.00
Size of Exhaust PipeInches	10	12	14	16	18	20	22	24
Price each	125.00	150.00	200.00	250.00	300.00	360.00	450.00	600.00
Size of Exhaust Pipe						32	34	36
Price		each 70	0.00 800	0.00 900	0.00 100	00.001	100.00	1200.00

OIL FILTERS



PLATE 5756 THE CROSS



PLATE 5757
THE SIMS IMPROVED

THE CROSS OIL FILTER

	Filtering Capacity Gallons per Day	Price
No. 1	20 to 30 5 to 10 40 to 50	29.50 19.50 60.00
No. 3 No. 4 No. 5.	50 to 60 70 to 90	75.00 90.00
No. 6	100 to 120	110.00

THE SIMS IMPROVED OIL FILTER

Size No.	Capacity in Gallons per day	Capacity Clean Oil in Gallons	Diameter Filter in Inches	Height of Filter in Inches	Shipping Weight	Price
00	2- 3	3 5	12 16	21 24	25 50	$\frac{10.00}{15.00}$
1	5-10 10-20	10 20	18 22	30 36	70 100	$\frac{20.00}{25.00}$
3 4	20-30 30-50	30 50	26 28	36 46	180 250	$\frac{35.00}{50.00}$

KIELEY'S STANDARD STEAM TRAPS

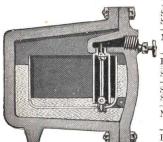


PLATE 710

SizeNo.	1	2	3	4
Size, InletInches Size, OutletInches	3/4 3/4	1	1 1/4 1 1/4	$\frac{1}{1}\frac{1}{2}$ $\frac{1}{2}$
Number lineal feet 1 in. pipe will drain.	4,000	6,000	10,000	15,000
Each	25.00	35.00	45.00	60.00
SizeN	0.	5	6	7
Size InletInch		2 2	$\frac{2\frac{1}{2}}{2\frac{1}{2}}$	3 3
Number lineal feet 1 in. pipe will drain.	25	,000	35,000	50,000
Each	. 80	.00	100.00	125.00

In ordering be sure to state whether for high or low pressure.

ANDERSON STEAM TRAPS

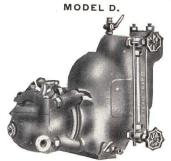


PLATE 71

PLATE / II										
Size Number of Trap	1	2	3	4	5	6	7			
Size of Pipe ConnectionInches	1/2	3/4	1	11/4	1 1/2	2	2 1/2			
Maximum Discharge of Condensation, per hour	1500	2400	4000	5600	8000	12000	24000			
face that should be applied	1000	2000	-000				20000			
Net Weight of Complete TrapPounds Shipping Weight, BoxedPounds	3000 81 110	5000 92 114	150		268		60000 525 620			
70.1		28.50					132.00			

Each Trap furnished with Water Gauge, By-Pass, Air Valve, Blow-Off Valve and Sediment Strainer.



NASON STEAM TRAPS



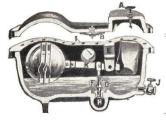
PLATE 705
INTERIOR VIEW NASON CLASS B,
CLASS C AND SIDELUG TRAPS.



PLATE 706 SIDELUG TRAP.

CLASS B, CLASS C AND SIDELUG STEAM TRAPS

NÓ	1	2	3	4	5
Pipe Connection Lineal feet 1 in. pipe Square feet surface Disc. Ibs. Water per minute	$1\frac{1}{2}$ 1500 500 $4\frac{1}{2}$	$ \begin{array}{r} 34 \\ 3450 \\ 1150 \\ 6\frac{1}{2} \end{array} $	1 5250 1750 10	$ \begin{array}{r} 1\frac{1}{4} \\ 7650 \\ 2550 \\ 15\frac{1}{2} \end{array} $	$ \begin{array}{r} 1\frac{1}{2} \\ 12000 \\ 4000 \\ 23 \end{array} $
Nason Class B, 1 to 20 lbs Nason Class C, 20 to 70 lbs Sidelug, 40 to 150 lbs	16.00 16.00 16.85	20.00 20.00 21.30	27.50 27.50 29.25	42.50 42.50 45.50	70.00 70.00 74.75



McDaniel Steam Traps.

No.	Inlet and Outlet	Drains	Each
1	1 in.	3500 ft. 1-in. pipe	30.00
2	1¼ in.	7000 ft. 1-in. pipe	40.00
3	1½ in.	14006 ft. 1-in. pipe	65.00
4	2 in.	20000 ft. 1-in. pipe	75.00
5	2½ in.	25000 ft. 1-in. pipe	100.00

PLATE 707

Regular Pressure Traps, all sizes, made to work from 1 to 100 lbs. Steam Pressure. Low Pressure Traps, all sizes, made to work from 1 to 20 lbs. Steam Pressure. For Extra High Pressure above 100 lbs

When not otherwise ordered, Regular Pressure Traps will be sent.

QUICK-OPENING HOT WATER RADIATOR VALVES



UNION RADIATOR VALVES WITH IMPROVED GROUND UNION

SizeInches	$\frac{1}{2}$	34	1	11/4	11/2	2
Wood Wheel						
Rough Body, Fin.		2.45	3.25	4.50	6.50	10.00
Rough Body, Plated						
all over	2.40	2.85	3.65	5.05	7.10	10.85
Finished Body		3.00	3.85	5.25	7.50	11.50
Finished Body,						
Plated all over		3.40	4.30	5.80	8.10	12.35

These Valves are made with male unions only, threads right hand on Union, right hand on bottom.

PLATE 4742

UNION ELBOWS FOR HOT WATER HEATING

SizeInches	$\frac{1}{2}$	3/4	1	1 1/4	$1\frac{1}{2}$	- 2
Rough Body, Plain Rough Body, Plated all						
Over	$\frac{1.75}{2.00}$	$\frac{2.00}{2.20}$	$\frac{2.50}{2.75}$	$\frac{3.20}{3.60}$	$\frac{4.00}{4.60}$	7.00
Finished all over Fin. and Plated all over.	$\frac{2.00}{2.25}$	$\frac{2.20}{2.40}$	$\frac{2.75}{3.00}$	$\frac{3.60}{3.90}$	$\frac{4.60}{4.85}$	7. 8.



PLATE 4743



GATE RADIATOR VALVES WITH UNION

Diameter of Opening Inches	1/2	3/4	1	11/4	$1\frac{1}{2}$	2
Rough Body, plated all over	3.65	4.25	5.20	6.60	9.00	12.80



JENKINS DISC RADIATOR VALVES

UNION RADIATOR VALVES.

WITH WOOD WHEEL AND IMPROVED GROUND MALE UNION



SizeInches	$\frac{1}{2}$	3/4	1
Rough Body, Finished Trimmings. Finished All Over. Rough Body, Plated Trimmings. Rough Body, Plated All Over. Finished and Plated All Over.	$\frac{3.20}{3.05}$	$\frac{4.00}{3.75}$	4.80 4.65 4.75
SizeInches	11/4	1 ½	2
Rough Body, Finished Trimmings. Finished All Over Rough Body, Plated Trimmings Rough Body, Plated All Over Finished and Plated All Over	$6.40 \\ 6.25 \\ 6.40$	7.75 8.75 8.00 8.10 9.25	12.60 13.85 12.85 13.10 14.35

PLATE 7868

These valves are made with male unions only. Threads right hand on Union, right hand on bottom,

LAVIGNE PACKLESS RADIATOR VALVES ROUGH BODY, NICKEL-PLATED







PLATE 7870 ANGLE VALVE, LEVER HANDLE, GRADUATED

ANGLE VALVES-WITH UNION

SizeInches	$\frac{1}{2}$	3/4	1	1 1/4	1 1/2	2
Wood wheel, lever handle or lock shield each	3.15	3.80	4.75	6.40	8.10	13.10

GRADUATED ANGLE						
SizeInches	$\frac{1}{2}$	3/4	1	1 1/4	1 1/2	2
Lever handle or lock shield each	4.15	4.80	5.75	7.40	9.10	14.10



STEAM AND HOT WATER HEATING BOILERS



PLATE 8099



PLATE 8100



PLATE 8101



PLATE 8102

We are distributors for several of the largest manufacturers of steam and hot water boilers and carry in stock a full line.

Catalogue and prices will be sent on request.

Can also furnish high pressure boilers.

HOT WATER AND STEAM RADIATORS



PLATE 8103

We carry in stock a line of Steam and Water Radiation and can furnish any type or style.

Prices and catalogue will be sent on request.

We are also prepared to furnish estimates on complete heating systems of any style; ot water, steam, vapor, vacuum, or pipeless furnaces



ARMSTRONG'S ADJUSTABLE STOCKS, AND DIES.



PLATE 753

No. 1 Stock, 4 Right-hand	
Pipe Dies, 1/8 to 1/2.	0 00
Each	9.00
No. 1 Stock, 4 each Right	
and Left Pipe Dies, 1/8	COLUMN DESIGNATION
to ½ Each	14.00
to ½ Each No. 2 Stock, 5 Pipe Dies,	
Right, ¼ to 1	12.00
No. 2 Stock, 6 Pipe Dies,	
Right, ½ to 1	14.00
No. 2 Stock, 5 Pipe Dies,	
Right and Left, 1/4 to 1.	20.00
No. 2 Stock, 6 Pipe Dies,	
Right and Left, 1/8 to 1.	23.00

This Stock will also take Bolt Dies.

DIES.

Prices for Dies quoted mean set of two pieces, numbered 1 and 2.

No. 1.	For Pipe 1/8, 1/4, 3/8, or 1/2, either Right or Left	1.25
No. 2.	For Pipe 18. 14. 38. 15. 34 or 1, either Right or Left Each,	1.50
No. 2.	For Brass Pipe %, %, 1 or 1 4, either Right or Leit Each,	2.00
No. 2 1/2.	For Pipe, double ends, $\frac{1}{2}$ x $\frac{3}{4}$ or 1x1 $\frac{1}{4}$, either Right or Left. Each,	3.25
No. 3.	For Pipe. $\frac{3}{4}$, 1, 1, 1, 1, or 2 inches, Right or LeftEach,	4.00
No. 4.	For Pipe, Sectional Dies, 1, 11/4, 11/2 or 2 in., Right or Left. Each,	3.00
No. 4.	For Pipe, Sectional Die Cutters onlyEach Cutter,	. 50
No. 6.	For Pipe, Double Ends, 2½x3 inch, Right or LeftEach,	15.00
No. 7.	For Pipe, Double Ends, 2½x3 inch, Right or LeftEach,	16.00
No. 7.	For Pipe, Double Ends, 3½x4 inch, Right or LeftEach,	16.00
No. 0.	Dies Bolt, 14, 16, 38, 18, 18, 19, 58, or 34, Complete with Collet . Each, Dies Bolt, 14, 16, 38, 16, 12, 58, or 34, without Collet Each,	1.95
No. 0.	Dies Bolt, $\frac{14}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{7}{16}$, $\frac{1}{2}$, $\frac{5}{8}$, or $\frac{3}{4}$, without Collet Each,	1.00
No. 1.	Dies Bolt, 4, 16, 38, or 16, Right Hand	1.50
No. 1.	Dies Bolt, ½, 58, or ¾, Right HandEach,	1.75
No. 2.	Dies Bolt, ½ or 5%, Right HandEach,	2.00
No. 2.	Dies Bolt, 34, 7% or 1, Right HandEach,	2.00
No. 2.	Dies Bolt, 1 1/8 or 1 1/4, Right HandEach,	2.25

Bolt Dies, Left Hand, will be furnished at same price.

	14				
Either No. 1 or	No. 2 half o	f No. 1 Die f	or Pipe	 	
Either No. 1 or					
Either No. 1 or					
Either No. 1 or					
Either No. 1 or	No. 2 half o	f No. 2 Die f	or Bolt	 	
Either A or B l	nalf of No. 2	½ Die for Pi	oe	 *****	
Either No. 1 or	No. 2 half o	f No. 3 Die f	or Pipe	 	
Either A or B l	nalf of No. 6	Die for Pipe		 	
Either A. B. C	or D quarter	of No. 7 Die	for Pipe	 	



ARMSTRONG'S ADJUSTABLE STOCKS, AND DIES.



PLATE 754 NO. 2 1-2.

No. 21/2 Stock, 4 Dies, Cutting 1/2, 3/4, 1 and 11/4 inch Right Hand	12.00
No. 2½ Stock and Dies, Cutting Right and Left, ½ to 1¼ inch	18.00
No. 3 Stock, 3 Sizes Pipe Dies, 1 ¼ to 2, Right	20.00
No. 3 Stock, 4 Sizes Pipe Dies, 1 to 2, Right	24.00
No. 3 Stock, 5 Sizes Pipe Dies, ¾ to 2, Right	28.50
No. 3 Stock, 3 Sizes Pipe Dies, 1 1/4 to 2, Right and Left	32.00
No. 3 Stock, 4 Sizes Pipe Dies, 1 to 2, Right and Left	40.00
No. 3 Stock, 5 Sizes Pipe Dies, 34 to 2, Right and Left	48.50



PLATE 755 NO. 7.

No. 6 Stock and Die, Cutting 21/2x3, Right Hand	40.00
No. 6 Stock and Die, Cutting 2½x3, Right and Left Hand	55.00
No. 7 Stock, Cutting 2½, 3, 3½, 4, Right	
No. 7 Stock, Cutting 2½ and 3, Right	45.00
No. 7 Stock, cutting 3 ½ and 4, Right	
No. 7 Stock, Cutting 2 ½ to 4, Right and Left	
No. 7 Stock, Cutting 2½ and 3 or 3½ and 4, Right and Left	60.00

EXTRA PARTS.

SizeInches	1	2	$2\frac{1}{2}$	3	4	6	7
Stocks Only Each Bushings Each Wrenches. Each	3.25 .20 .25	4.00 .25 .25	4.50 .40 .25	7.00 .50 .50	7.00	25.00 1.00 .50	30.00 1.50



TOLEDO ADJUSTABLE THREADING DEVICES





PLATE 4260 NO. 00

PLATE 4261 NO. 1

EXTRA DIES FOR NO. 1 AND NO. 1A.

1 inch, per Set of 4 Pieces	$\begin{bmatrix} 2.50 \\ 2.50 \end{bmatrix}$	$1\frac{1}{2}$ inch, per Set of 4 Pieces 2 inch, per Set of 4 Pieces	$\frac{2.50}{2.50}$



PLATE 4262 NO. 10.

Threads pipe from 1 inch to 2 inches.....

28.00



PLATE 4263 NO. 2, RATCHET



PLATE 4264 NO. 3, RATCHET

Threads	pipe	from	21/2	to 4	inch,	
inclusi	ve					100.00

Threads pipe from 4½ to 8 inch, inclusive...... 300.00

EXTRA DIES FOR NO. 2.

EXTRA DIES FOR NO. 3

2½, 3, 3½, 4 inch. Per Set of 5		$4\frac{1}{2}$, 5, 6, 7, 8 inch	Per Set of 5
Pieces	8.00	Pieces	12.00



BEAVER" DIE STOCKS.

NARROW RECEDING DIES







PLATE 761

PLATE 762

PLATE 763

NO. 25B, 1 TO 2 IN. NO. 26B, 1 TO 2 IN. RATCHET STOCK

PLATE 763 NO. 41, 2 1-2 TO 4 INCH. NO. 60, 2 1-2 TO 6 INCH. NO. 80, 4 1-2 TO 8 INCH

Number	25B	26B	41	60	80
Threads Pipe, Right HandInches	1 to 2	1 to 2	2½ to 4	2½ to 6	4½ to 8
List Prices, Complete Stocks List Prices, Extra Dies, per Set	30.00	35.00 3.50	110.00	220.00 14.00	300.00

"Beaver" Die Stocks have the easy working, narrow receding dies (one man cuts any size) and are adjustable. Nos. 25B, 26B and 41 thread all sizes with one set of dies—no changing; No. 60 uses two sets (2½, 3, 3½) and (4, 4½, 5, 6); No. 80 two sets (4½, 5, 6) and (7, 8). Nos. 25B and 26B have universal chucks Nos. 41, 60 and 80 use bushings. No. 41 has 5 chasers, Nos. 60 and 80 have 6

BEAVERETTE DIE STOCKS

WARREN DIE STOCKS





PLATE 764

PLATE 765

LIST, COMPLETE RIGHT OR LEFT AS ORDERED	LIST EXTRA DIES RIGHT OR LEFT AS ORDERED
No. 6, ¼, ¾, ½, ¾····· 15.00	$(\frac{1}{8}), (\frac{1}{4}, \frac{3}{8}) \text{ or } (\frac{1}{2}, \frac{3}{4}) \dots 3.00$
m	

Two sets of wide non-receding chaser dies $(\frac{1}{4}, \frac{3}{8})$ and $\frac{1}{2}$, $\frac{3}{4}$ to cover the two thread pitches) are held in the stock and operated by a single cam, no changing, and are adjustable.

RIGHT OR LEFT	RIGHT OR LEFT
AS ORDERED	AS ORDERED
No. 120, ¼-3/8. 6.50	
No. 121, ½-¾. 7.00 No. 122, 1-1¼. 8.00	1.50 No. 121, $\frac{1}{2}$ - $\frac{3}{4}$. 1.60
No. 122, 1-1 4. 8.00	No. 122, 1-1 1/4. 2.00
No. 123, 1 1/6-2, 10, 00	No. 123, 1 1/6-2, 2.50

LIST, COMPLETE | LIST EXTRA DIES

Each "Warren" Die Stock threads two sizes of pipe without changing dies, are adjustable and have bushings for each size Provided with cam centering device. Pipe. Furnished with right or left dies as ordered. They are sturdy tools. Wide (non-receding) chaser dies.

Complete catalogue of "Beaver" Tools on application.



NYE DIES



PLATE 893 SOLID

SOLID DIES

PLATE 894 ADJUSTABLE

Size block 4x4x 1/8	Size block 3x3x ³ / ₄	Size block 2½x2½	Size block $2x2x\frac{1}{2}$
for No. 2 Stock	for 1½ & 1¾ Stock	x¾ for No. 1 Stock	
1½ inch. Each, 5.00	1 inch. Each, 4.00	1 inch . Each, 4.00 34 inch . Each, 3.00 1/2 inch . Each, 3.00 3/8 inch . Each, 2.50	% inch. Each, 2.50
1¼ inch. Each, 4.50	1 inch. Each, 4.00		14 inch. Each, 2.50
1 inch. Each, 4.50	3 inch. Each, 3.50		18 inch. Each, 2.00
34 inch. Each, 4.00 1/2 inch. Each, 4.00	3% inch. Each, 3.00	14 inch. Each, 2.50 18 inch. Each, 2.00	Size block 5x5x1¼
	14 inch. Each, 3.00 1/8 inch. Each, 2.50		2½ inch. Each, 13.00 3 inch. Each, 14.00

ADJUSTABLE DIES TO FIT ARMSTRONG STOCKS

1/8 inch to 1/2 inch to fit No. 1 stock	3.50
% inch to 1 inch to fit No. 2 stock	3.50
1/2 inch to 11/4 inch to fit No. 21/2 stock	5.00
1/2 inch to 1/4 inch to fit No. 21/2 stock Each,	5.00
inch x 1¼ D. E. inch to fit No. 2½ stock Each,	5.00
1/2 inch to 2 inch to fit No. 3 stock	5 00
1/2 inch to 2 inch to ht No. 3 stock. 1/2 inch x 3 D. E. inch to fit No. 6 stock. Each,	25 00
1/2 inch x 3 D. E. inch to fit No. 6 stock. Each,	35.00
3½ inch x 4 D. E. inch to fit No. 7 stock	00.00

THE NYE UNION VALVE NIPPLE WRENCH



PLATE 895

This Wrench is made in such a way that when inserted in a radiator union valve it catches the nipples at the base, thereby avoiding the danger of mashing them, which so commonly occurs where a wrench handle or metal bar is used for this purpose.

This tool is hollow and very light, but strong enough to stand any strain required while in use.

It takes sizes from three-fourths to two inches, inclusive.

	T FO
Each	1.50

OSTER HAND PIPE MACHINES



PLATE 5292 NOS. 204 AND 206



PLATE 5293 NOS. 16 AND 17

HAND PIPE MACHINES

No.	Sizes, Right Hand, Inches	Sets of Dies	Price without Tripod	Extra Dies Per Set	Price Tripod Stand
201 204	1/4 to 2 1 to 4	4	60.00 140.00	3.00 4.00	10.00
204	1 to 6	6	225.00	5.00	25.00

The 4 inch and 6 inch Hand Machines have two speeds for large and small pipe, both on one shaft.

The change is made quick without removing crank or any part of machine.

GEARED DIE STOCKS, Nos. 16 AND 17

Number	16	1 17
Threads, pipe	2½ to 4 275	2½ to 6 500
Price, with bench bracketeach Price, with tripod, completeeach Price, diesPer Set of Four	110.00 125.00 4.00	185.00 200.00 5.00

Geared die stocks have no leading screw; the dies are started with a lever attached to a rack and pinion, and one movement of the lever brings the head to position for the next cut without backing over the finished threads.

COE'S WRENCHES



PLATE 5399

SizeInches	6	8	10	12	15	18	21
BlackPer Dozen BrightPer Dozen	10.00 14.00	$\frac{12.00}{16.00}$	14.00 19.00	18.00 24.00	$\frac{24.00}{32.00}$	$\begin{array}{c} 32.00 \\ 42.00 \end{array}$	$\frac{39.00}{51.00}$



PLATE 5400

28 inch Each,	12.00
36 inch	26.00
48 inch	

WESTCOTT ADJUSTABLE "S" WRENCHES



PLATE 5401 NUT WRENCH

	Doz.
6 inch opens to 3/4 inch.	8.00
8 inch opens to 1 inch.	10.00
	12.00
	15.00
14 inch opens to 2 inch	21.00

STILLSON WRENCHES



PLATE 7689

Length, OpenInches	6	8	10	14	18	24	36	48
Takes Pipe	1/8 to 1/2	1/8 to 3/4	1/8 to 1	1/4 to 1 1/2	to 2	1/4 to 2 1/2	1/4 to 3 1/2	1 to 5
Wrench Complete Jaws each Frames each Adjusting Nuts each Wood Handles each End Nuts each Frame Pins each Spring Rivets each Springs each Number of Springs to each Wrench steel Handle Steel Handle each	.75	2.25 .80 .42 .15 .16 .15 .03 .01 .10 1	2.50 .85 .50 .20 .18 .20 .04 .02 .10 3	1.15 .60 .30 .25 .20 .04 .02 .10 3	5.00 1.75 .75 .35 .28 .20 .04 .02 .10 3 2.25	2.25 .95 .55 .04 .02 .11 3	$\frac{4.35}{1.70}$	7.50 2.20 1.50

TRIMO PIPE WRENCHES



PLATE 7690

Length, OpenInches	6	8	10	14	18	24	36	48
Takes Pipe	1/8 to 1/2	1/8 to 3/4	1/8 to 1	1/4 to 11/2	1/4 to 2	to 2 ½	1/4 to 3 1/2	to 5
Wrench Complete Moveable Jaws each Nuts each Insert Jaws each Frames each Springs each Frame Pins each Jaw Pins each Steel Handles each Wood Handles with Ferrule each Nut Guards (per pair) each	.75 .12 .35 .38 .03 .03 .03	.80 .15 .40 .42 .03 .03	.85 .20 .50 .50 .03 .04 .04	1.15 .30 .60 .60 .03 .04	1.75 .35 .70 .75 .04 .04	2.25 .55 .80 .95 .04 .04 .04 3.50	4.35 1.10 1.10 1.70 .04 .05	7.50 1.50 2.00



VULCAN BIJAW CHAIN PIPE WRENCHES WITH DOUBLE-ENDED REVERSIBLE JAWS, AND EITHER CABLE OR FLAT LINK CHAIN

FOR TURNING OR HOLDING PIPE, PIPE FITTINGS, BOLTS, BARS, SHAFTS, ETC, FROM 1-8 TO 12 INCHES DIAMETER



No	30	31	32	33	$33\frac{1}{2}$	34	35	*16
Capacity, Size Pipeins. Extreme Lengthins. Weightlbs.	133	\$ to 1½ 20 5¾	to 2½ 27 10	3 to 4 37 16	$1 \text{ to } 6 \\ 44\frac{1}{2} \\ 24$	1½ to 8 50½ 31	2 to 12 64½ 50	4 to 18 87 137
Flat Chain: Breaking Strainlbs.	3,600	6,700	9,800	12,500	14,300	15,700	21,600	40,000
Cable Chain: Breaking Strainlbs.	1,200	4,000	6,000	10,500	12,500	15,000	19,000	40,000
Price, Complete Wrench.ea. Extra Chainea. Extra Jawspr.	2.50 .75 1.00	$3.50 \\ 1.00 \\ 1.75$	$5.00 \\ 1.50 \\ 2.75$	7.00 2.50 4.00	$9.00 \\ 3.25 \\ 4.75$	$11.00 \\ 4.00 \\ 5.50$	$18.00 \\ 6.00 \\ 7.50$	40.00 13.00 16.00

^{*} For pipe, etc., above 12 inches in diameter, old style (non-reversible jaws) are supplied.

AGRIPPA CHAIN PIPE-FITTINGS WRENCHES. WITH FLAT LINK CHAIN ONLY.



No	20	21	22	23	$23\frac{1}{2}$	24	25
$\begin{array}{ccc} \text{Capacity Pipe FittingsIn.} \\ \text{Price.} & \text{Ea.} \\ \text{Extreme Length.} & \text{In.} \\ \text{Weight.} & \text{Lb.} \end{array}$	$\frac{2.50}{13\%}$	1/8 to 1 1/2 3.50 20 5 3/4	14 to 2 ½ 5.00 27 9 ¾	34 to 4 7.00 37 17	1 to 6 9.00 44½ 24	11.00	$ \begin{array}{r} 2 \text{ to } 12 \\ 18.00 \\ 64 \frac{1}{2} \\ 56 \end{array} $
Extra Jaws Ea. Extra Chains . Ea. Length In. Breaking Strain . Lb.	1.00	1.75 1.25 15 6,700	2.75 1.75 $19\frac{1}{2}$ $9,800$	4.00 2.75 26 $12,500$	$ \begin{array}{r} 4.75 \\ 3.75 \\ 34 \\ 14,300 \end{array} $	5.50 4.50 45 15,700	7.50 6.75 61 21,800



TRIMO PIPE CUTTERS.



PLATE 770

Size No	1	2	3
Cuts PipeInches	1/8 to 1 1/4	½ to 2	1 1/4 to 3
PriceEach	4.50	6.00	10.00
Extra NutsEach	.35	.35	.40
Extra Wheels. Each Extra Rolls. Each	.30	.30 .30	.40
Extra Pins with Cotter PinsPer Dozen Extra Anti-Friction WashersPer Dozen	1.00	1.00	1.00
Extra Fork Block Carrier Each Extra Roll Block Each	1.25	1.50	.10 2.25
Extra Frame Each	2.25	2.50	3.50
Extra Handle Screw Each Extra Handle Each	1.00	$\substack{1.25\\.35}$	$\frac{2.00}{.35}$
Extra Roll Block Pin Each	.03	.03	.03

Saunders' One Wheel and Roller Pipe Cutters.



PLATE 771

No	1	2	3	4	5
Cuts PipeInches	½ to 1	1 to 2	2 to 3	2 ½ to 4	4 to 6
PriceEach Extra Block and Wheel. Each Extra Wheels. Each	1.25 .24	4.50 1.75 .32	11.00 2.75 .60	18.00 3.50 .60	28.00 4.00 .60
Extra Rollers Each Extra Pins Each	. 24	.32	.50	.50	.60 $.15$

BARNES PIPE CUTTERS.



PLATE 772

No	1	2	3	4	5	6	7
Cuts PipeInches	½ to 1	½ to 2	1½ to 3	2½ to 4	4 to 6	6 to 8	9 to 12
Price Each		6.00	10.00	20.00	30.00	40.00	50.00
Extra WheelsEach Extra Wheel PinsEach		.30	.40	.50	$.75 \\ .20$.75 .25	$\begin{array}{c} .75 \\ .25 \end{array}$

THE VULCAN PATENT DROP FORGED CHAIN PIPE VISES



PLATE 5717

	1		PRICES, V	VISES AND I	PARTS			
No.	Capacity Pipe Sizes Inches	Comp. Vise	Jaws Pair	Chain & Screw	Screw	Handle & Nut	Nut	Washer
1 2 4	1/8 to 2 1/4 to 4 3/4 to 8	3.50 7.50 18.00	1.50 3.50 9.00	1.25 2.40 6.00	.40 .70 1.25	1.10 2.10 3.50	$ \begin{array}{r} .70 \\ 1.35 \\ 2.00 \end{array} $.15 .25 .45



PLATE 5718

REED STRAP VISES

For Nickel Plated or Polished Pipe or Tubing.

Number	51
Capacity, inches	1/8 to 2 Pipe
Price, Vise	4.00
Price, Strap	. 50



REED PIPE VISES



PLATE 5712 STANDARD VISE NOS. 7000 TO 73 INCLUSIVE

	PLATE 5711						
E	XTR	A H	EA	VY	VIS	E	
NOS.	600	то	66	IN	CLU	SIV	E
					-		

Vise No.	Holds Pipe Inches	List Jaws Per Set (3)	Each
61	½ to 2½	3.00	10.00
62	$\frac{1}{8}$ to $3\frac{1}{2}$	4.50	15.00
63	1/8 to 4 1/2	6.00	25.00
64	1/8 to 6	10.50	50.00
65	1 to 8	15.00	100.00
66	$1\frac{1}{2}$ to 12	22.50	150.00
7000	1/8 to 1 1/4	2.10	5.00
700	1/8 to 1 1/2	2.25	6.00
70	1/8 to 2	3.00	7.50
71	1/8 to 2 1/2	3.00	10.00
72	1/8 to 3 1/2	4.50	15.00
73	1/8 to 4 1/2	6.00	25.00

REED COMBINATION PIPE VISE

SWIVEL BASE

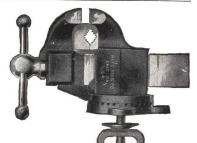


PLATE 571

				PLAIL STI	3
No.	Width Jaw Inches	Weight Lbs.	Capacity Pipe Inches	List Jaws Set (3)	Each
31 32	3 ½ 4 ¼	46 72	1/8 to 2 1/2 1/8 to 3 1/2	1.25 1.50	16.00 22.00
33 34	6	$\frac{119}{178}$	18 to 4 1/2 18 to 6	$\frac{1.75}{2.50}$	$\frac{32.00}{45.00}$



REED MACHINISTS VISES



PLATE 5388
SWIVEL JAW STATIONARY BASE VISE

No.	Width Jaw	Opens	Weight	Each
302	2 in.	2 ½ in.	13 lbs.	5.00
302 1/2	$2\frac{1}{2}$ in.	3 in.	17 lbs.	5.50
303	3 in.	3 ½ in.	25 lts.	6.25
303 1/2	$3\frac{1}{2}$ in.	4 in.	34 lbs.	7.00
304	4 in.	4 3/4 in.	48 lbs.	9.00
$304\frac{1}{2}$	4 ½ in.	5 ½ in.	64 lbs.	10.50
305	5 in.	$6\frac{1}{2}$ in.	82 lbs.	14.00
$305\frac{1}{2}$	$5\frac{1}{2}$ in.	7 3/4 in.	116 lbs.	17.00
306	6 in.	9 in.	141 lbs.	24.00
307	7 in.	$11\frac{1}{2}$ in.	198 lbs.	30.00
308	8 in.	12 in.	273 lbs.	40.00



PLATE 5389 SWIVEL JAW SWIVEL BASE VISE

No.	Width Jaw	Opens	Weight	Each
402	2 in.	21/2 in.	15 lbs.	6.25
402 1/2	$2\frac{1}{2}$ in.	3 in.	20 lbs.	6.75
403	3 in.	3 ½ in.	30 lbs.	7.50
403 1/2	$3\frac{1}{2}$ in.	4 in.	41 lbs.	8.50
404	4 in.	4 3/4 in.	56 lbs.	10.50
404 1/2	4 ½ in.	$5\frac{1}{2}$ in.	72 lbs.	12.50
405	5 in.	$6\frac{1}{2}$ in.	98 lbs.	16.00
405 1/2	$5\frac{1}{2}$ in.	$7\frac{3}{4}$ in.	138 lbs.	19.00
406	6 in.	9 in.	157 lbs.	27.00
407	7 in.	$11\frac{1}{2}$ in.	218 lbs.	35.00
408	8 in.	12 in.	300 lbs.	45.00



REED MACHINISTS VISES



PLATE 5386 STATIONARY JAW, STATIONARY BASE VISE

No.	Width Jaw	Opens	Weight	Each
102	2 in.	3 in.	11 lbs.	4.75
102 1/2	2 ½ in.	$3\frac{1}{2}$ in.	14 lbs.	5.25
103	3 in.	4 in.	22 lbs.	6.00
103 1/2	3 ½ in.	5 in.	29 lbs.	7.00
04	4 in.	6 in.	41 lbs.	8.50
04 1/2	$4\frac{1}{2}$ in.	7 in.	54 lbs.	10.00
.05	5 in.	8 in.	71 lbs.	13.00
05 1/2	$5\frac{1}{2}$ in.	9 in.	105 lbs.	18.50
106	6 in.	10 in.	128 lbs.	25.00
.07	7 in.	12 in.	174 lbs.	37.50
.08	8 in.	12 in.	248 lbs.	50.00
109	9 in.	13 in.	290 lbs.	62.50



PLATE 5387 STATIONARY JAW, SWIVEL BASE VISE

No.	Width Jaw	Opens	Weight	Each
202	2 in.	3 in.	13 lbs.	5.75
$202\frac{1}{2}$	$2\frac{1}{2}$ in.	$3\frac{1}{2}$ in.	18 lbs.	6.50
203	3 in.	4 in.	28 lbs.	7.50
203 1/2	3 ½ in.	5 in.	36 lbs.	8.75
204	4 in.	6 in.	49 lbs.	10.50
204 1/2	4 1/2 in.	7 in.	64 lbs.	12.50
205	5 in.	8 in.	87 lbs.	16.00
205 1/2	5½ in.	9 in.	118 lbs.	22.00
206	6 in.	10 in.	147 lbs.	30.00
207	7 in.	12 in.	203 lbs.	42.50
208	8 in.	12 in.	278 lbs.	55.00
209	9 in.	13 in.	324 lbs.	67.50

TOLEDO RATCHET BORING TOOLS



PLATE 5289

Price, eachWith	2 inch and	$2\frac{1}{2}$ inch bits	25.50
	EXTRA	BITS	
$2\frac{1}{2}$ inch each 2 inch each	6.00 4.50	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3.00

PIPE END REAMERS



PLATE 5290 WITHOUT RATCHET



PLATE 5291 WITH RATCHET

Plate 5290	Each,	5.00
Plate 5291	Each,	7.50

For removing burrs from the ends of wrought iron and steel pipe, 3 inch and smaller. With this tool the burr is entirely removed and not spread.

PLATE 5290		REPAIR LIST		ГЕ 5291	
Brace Knob Screw. Each,		Brace Knob	. 20	Dog	.35
Brace Knob Each,		Brace Knob Screw.		Spring	
Stock Each,	.60	Cap	.05	Spring Top Screw	. 15
Handle Bar Each,		Plate	.35	Ratchet Stock	1.00
Rivets (3) Each,				Rivets (3)	.05
Blades (3) Each,	1.20	Handle Bar	.80	Frame	2.10
Frame Each,	2.10	Ratchet Wheel	1.00	Blades (3)	1.20

In ordering repairs, state whether for Plate 5290 Plain or Plate 5291 Ratchet Reamer, and name of part wanted.



STARRETT'S TOOLS



PLATE 7005 YANKEE SPRING DIVIDER



PLATE 7006 YANKEE SPRING DIVIDER

Price either style.

SizeInches	$2\frac{1}{2}$	3	4	5	6	8	10	12
Solid Nut each Spring Nut each	. 65 . 80	.70 .85	.75	.80	.85	1.10 1.25	1.25 1.50	1.50 1.65

Always sent with solid nut unless otherwise ordered.

CALIPERS



PLATE 7007 YANKEE INSIDE CALIPER



PLATE 7008 YANKEE KEYHOLE CALIPER

No. 81. No. 82.	Inside, with solid nut each Keyhole, with solid nut each	. 70	.75	.80	.85

Spring nut on No. 82, 15c extra.

STARRETT'S TOOLS CALIPERS







PLATE 7010

LOCK-JOINT TRANSFER CALIPER LOCK-JOINT TRANSFER CALIPER

These instruments not only have all the excellent features of Nos. 38 and 39, but in addition to common use may be used inside of chambered cavities, over flanges, etc., removed and replaced without losing the size calipered.

The sizes given refer to the length of the calipers, but the outside ones will caliper a cylinder 20 per cent. larger than their length, and the inside calipers will open nearly twice their length.

No. 36 and No. 37.

SizeInches	4	5	6	8	10	12	14	16	18	20	24
Each	1.25	1.40	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.50	4.25



PLATE 7011 LOCK-JOINT CALIPER



PLATE 7012 LOCK-JOINT CALIPER

Reliable calipers of wide scope for both inside and outside work, that can be instantly adjusted to their full extent, and as quickly locked firm in the joint, and yet provided with a sensitive adjustment. No. 38 and No. 39

140. 55 and 140. 55.											
SizeInches	. 4	5	6	8	10	12	14	16	18	20	24
Each	. 90	. 95	1.00	1.25	1.50	1.75	2.00	2.25	2 50	2 75	3 50



STARRETT'S TOOLS CALIPERS

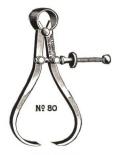






PLATE 7000 YANKEE THREAD CALIPERS

PLATE 7001 INSIDE THREAD CALIPERS

PLATE 7002 OUTSIDE THREAD CALIPERS

No. 184. Designed for measuring the diameter at the bottom of threads.

No. 179. Designed for measuring the diameter at bottom of threads on the outside of screws.

No.	SizeInches	3	4	5	6
184 179	Yankee Thread Caliper, Solid Nut. each Yankee Thread Caliper, Spring Nut. each Inside Thread Caliper, Solid Nut. each Luside Thread Caliper, Spring Nut. each Outside Thread Caliper, Solid Nut. each Outside Thread Caliper, Spring Nut. each Outside Thread Caliper, Spring Nut.	1.00	. 90	. 95 1.10 .80 .95 .80	 .85 1.00 .85 1.00

Always sent with solid nut unless otherwise ordered.



HERMAPHRODITE CALIPERS



PLATE 7003

No. 42. With adjustable point, lock-joint and sensitive adjustment. No. 242. Same as No. 42 except that both points are solid, neither being adjustable.

SizeInches	4	6	8	10
No. 42. each No. 242. each	1.00	1.15	1.35 1.25	1.60 1.50

STARRETT'S TOOLS No. 226 MICROMETER CALIPERS

From 1 to 6 Inches.



PLATE 7017

These micrometers meet the demand for accurate gauges at a low price. They are better adapted for general use than the vernier or bar micrometer, as they can be set quickly for the different measurements and are more easily read.

Each micrometer is graduated to read by thousandths of an inch, is furnished with patent lock nut, and is sent with or without ratchet stop as desired.

The frames are drop forged from bar steel and are nicely finished.

The 1 inch has the decimal equivalents stamped on the frame. The other sizes are marked to show their capacity.

Standards for use in adjusting these micrometers will be furnished when desired.

Micrometers will be supplied singly or in sets as desired, and will be sent with ratchet stop and without leather case or standard unless otherwise ordered. A reduction is made in the price when sold in sets,

 $\frac{39.25}{43.25}$

42.25

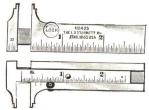
PRICES

1 inch, with decimal equivalents stamped on frame, without ratchet stopeach inch, with decimal equivalents stamped on frame, with ratchet stopeach	6.00
2 inch, from 1 inch to 2 inches, without ratchet stop.	6.50
2 inch, from 1 inch to 2 inches, with ratchet stop	5.50
2 inch, standard	6.00
1 inch standardeach	1.00
3 inch, from 2 inches to 3 inches, without ratchet stop.	6.50
3 inch, from 2 inches to 3 inches, with ratchet stop	7.00
Z Inch standard	1.00
4 Inch. from 3 Inches to 4 Inches, without ratchet stop	7.00
4 Inch, from 3 Inches to 4 Inches, with ratchet stop	7.50
ough	1.15
oneh	7.75
5 Inch, from 4 Inches to 5 Inches, with ratchet stop	8.25
4 Inch standard	1.35
b Inch. from 5 inches to 6 inches, without ratchet stop	8.50
b inch, from a inches to b inches, with ratchet stop	9.00
5 inch standard each	1.50
PRICES IN SETS	
Set of 3 micrometers, 1, 2 and 3 inch, without ratchet stop	16.00
In case	18.00
Set of 3 micrometers, 1, 2 and 3 inch, with ratchet stop.	17 50

Set of 6 micrometers, all sizes from 1 inch to 6 inch, without ratchet stop...

Set of 6 micrometers, including all sizes from 1 to 6 inch, with ratchet stop.

STARRETT'S TOOLS



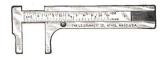


PLATE 7013 NO. 425. POCKET SLIDE CALIPER

PLATE 7014

NO. 424. SLIDE RULE CALIPER AND
CIRCUMFERENCE GAUGE

No. 425 Graduated in 32ds and 64ths.		
SizeInches	3	5
Each	2.50	3.50

No. 425a. Graduated in 32ds on the stock and 100ths on the slide. Price the same as No. 425.

No. 424

This gauge has a double function—being graduated to read the circumference as well as the diameter of the thing measured, the relation of circumference to diameter being shown by the graduations on upper corners of the rule (capacity 3½ inches, about 11 inches circumference). The jaws, being $1\frac{\pi}{2}$ inches deep, will caliper a cylinder up to $2\frac{\pi}{2}$ inches in diameter. The rule is graduated in 32ds of an inch standard and 16ths of an inch circumference measure.



PLATE 7015
NO. 25. CALIPER SQUARE



PLATE 7016 NO. 173. FIRM DOUBLE JOINT CALIPERS FOR BLACKSMITHS

No. 25

An improved tool for both outside and inside measure. The beam is graduated, 64ths on one side, 100ths on the other.

Size	3	4	6
With adjustable screw each Without adjustable screw each	5.00 4.25	6.50 5.50	9.00
With hardened jaws, extra.			

Sent with adjustable screw and without case unless otherwise ordered.

No.173. These calipers are well made, have perfect joints and a long handle to caliper with comfort hot forgings—the long arm to be used for the greater and the short one for the smaller or finished size. The difference in the length of arms prevents using the wrong caliper when there is but slight variation in the work measured. The caliper is 22 inches in length over all and has a 6 inch caliper on one side and a 12 inch caliper on the other side.

Each	 2.00



STARRETT'S TOOLS SQUARES, PROTRACTORS AND COMBINATION SETS





PLATE 7018

NO. 20. HARDENED EDGE SOLID STEEL

SQUARE. NOT GRADUATED

DIATE

PLATE 7019
NO. 63. GRADUATED HARDENED
7018 STEEL SQUARE

	7	FLATE TOTO									
Blade inside beam Inches	1	1 1/2	2	3	$4\frac{1}{2}$	6	9	12	15	18	24
Full length of beam inches Each	1 1.50	$\frac{1\frac{1}{2}}{1.75}$	$\frac{1}{2}$	$\frac{2\frac{3}{8}}{2.50}$	3 ½ 3 . 50	$\begin{array}{ c c c }\hline 4\frac{5}{16} \\ 4.50 \\ \end{array}$	$\frac{5\frac{9}{16}}{6.50}$	7 9.00	8 5/8 15.00	$10\frac{1}{2}$ 18.00	$12\frac{5}{16}$ 25.00

PLATE 7019

This square has concave depressions in each side of the stock. Convenient to hold between the thumb and finger while being used. The stocks are case hardened, the blades hardened to spring-temper and graduated in 32ds of an inch on one side and 64ths on the other.

BladeInches	2	3	4	6	9	12
Length of beaminches Priceeach	$\frac{1\frac{1}{2}}{1.50}$	2 2 2 . 00	$\frac{2\frac{3}{4}}{2.50}$	$\frac{3\frac{3}{4}}{3.50}$	5 5.50	6½ 6.50





PLATE 7021

PLATE 7020

NO. 12. IMPROVED BEVEL PROTRACTOR

WITH HARDENED BLADE

P

NO. 9. COMBINATION SETS
PLATE 7020 HARDENED BLADE

An adjustable rule, held firmly at any point by a thumb nut, passes through a revolving turnet which is nicely graduated in degrees from 0 to 180, both right and left and can be accurately adjusted to show any angle.

The blades are the same as those used on our No. 11 squares. Those of No. 4 graduation will be sent unless otherwise ordered. The head is 7 inches long.

SizeInches	9	12	18	24
Completeeach	2.75	3.00	3.50	4.00
Protractor Head with Level attachment			each	2.00

PLATE 7021

Cut shows Combination Square (No. 11) with center head and 7 inch Bevel Protractor head (No. 12) all on the No. 11 square scale. Each head may be instantly removed, or replaced and used interchangeably with the scale.

SizeInches	9	12	18	24
Set completeeach	3.75	4.00	4.75	5.25

STARRETT'S TOOLS



PLATE 7024

NO. 10 PATENT INCLINOMETER HARDENED BLADE

Cut represents inclinometer, try square, and bevel protractor combined. The blades are graduated one edge in 8th, 16ths, 32ds, and 64ths.

Size of BladeInches	12	18	24
Each	4.00	5.00	6.00
Center head, to fit all sizes.			

SPEED INDICATORS



PLATE 7025 NO. 104. HIGH SPEED INDICATOR

NO. 106. IMPROVED SPEED INDICATOR

This indicator may be run at highest speed required without heating, and this on account of our frictionless bearing against which the inner end of the spindle revolves (a feature patented by us). The working parts of this instrument are encased, and the dial plate has two rows of figures, reading right or left, as the shaft may run.

Nickel plated, in pasteboard box. each Nickel plated, in leather case each	1.00
Nickel plated, in feather caseeach	1.50

We supply the indicators with a spindle $7\frac{1}{2}$ inches long for use on Dairy Machines, etc., for 50c extra.

No. 106

The graduations show every revolution, and with two rows of figures read both right and left, as the shaft may run. The instrument is nickel plated, and has a rosewood handle.

In pasteboard box each	1.50
In leather case	2.00





PLATE 7027

PLATE 7028

NO. 107. REGISTERING SPEED INDICATOR

Showing Attachment Applied to Indicator
This instrument was devised to automatically register hundreds as well as units and
tens, and thus relieve the mind from keeping tally. Will register 5,000 revolutions.

In pasteboard box	3.00
In leather case each	3.50



MEASURING TAPES



PLATE 7036

"CHALLENGE" STEEL MEASURING TAPES

PLATE 7037 IMPROVED METALLIC MEASURING TAPES

PLATE 7036 With %-inch Tan

- ILAIL 10	30	AA 1011 28-1	men rap	e		
No	260	261	263	264	265	266
Length feet Per dozen	25 39.00	33 42.00	50 48,00	66 60.00	75 63.00	100

Marked feet and 12ths (inches and eights).

For 10ths and 100ths of feet add D to number

PLATE	703	7					
No	500	501	502	503	504	505	506
Lengthfeet Marked one side only 12thsper doz. Marked both sides 10ths and 12thsper doz.	20 40	24 00	96 40	20 00	99 60	97 90	10 00



PLATE 7038 ASS SKIN MEASURING TAPES

PLATE 7038

PLATE 7039
POCKET TAPES
With 1/2-inch Cotton Tape

Number	710	711	712	713	714	715	716
Length feet Per dozen	25 3.75	33 4.00	40	50 5.00	66	75 7 50	100

Marked One Side Only, With ¼-Inch Steel Tapes. Marked Inches and 16ths.

Number	143	145	146	148
Size inch	36	60	72	96
Tape inch	1/4	1/4	1/4	1/4
Per dozen . inch	7.00	9.00	10,00	14 . 00

With 1/4-Inch Enameled Linen Tapes. Marked Inches and 8ths.

Number	173	175	176
Size inches	36 3.50	60	72 5 00

STARRETT'S TOOLS

SPRING TEMPERED RULES

delibilitate	بلينيا ليلتليليان	Libit	HILLIAM
TEMPERED NO 4		2	NO 300
32	1 1 2	-	Y 760

32 ТВОРСКО ИО 4 Т ЛЕСЬ 57/МВОГИСО 2 NO 303 **2 % Н

PLATE 7022

PLATE 7023

Thickness	3	inch	or	No	18	Gange

WidthInches	1/2	1/2	16	5/8	3/4	7/8	1	11/8	11/4	11/4	11/4
Length inches Each	1 .20	2 .30	3	4 .50	6	9	12 1.25	18	24 2 50	36 5.00	48

The above list applies on all spring tempered rules.

No.	Graduation	No.	Graduation
301	No. 4 No. 1	307 308	No. 15
306	No. 2	309	No. 16

WITH GRADUATED END

2 inch to 24 inch lengths

No. 303 has No. 4 graduations and is graduated in 32ds of an inch on opposite sides of one end.

WITH ONE BEVELED EDGE

1 inch to 24 inch length

No. 400. Beveled, No. 4 graduation with 64ths on beveled edge.

No. 407. Beveled, No. 7 graduation with 100ths on beveled edge.

WITH ONE BEVELED EDGE AND GRADUATED END

2 inch to 24 inch lengths

No. 403. Beveled, No. 4 graduation, with 64ths on the beveled edge and graduated in 3^{9} ds of an inch on opposite sides of one end.

Rules are divided into parts of inches, as follows:

No. 1 Graduation	No. 6 Graduation	No. 13 Graduation
1st corner10, 20, 50, 100	1st corner 32	1st corner 8
2d corner12, 24, 48	2d corner 48	2d corner 16
3d corner 16, 32, 64	3d corner 50	
4th corner14, 28	4th corner 64	No. 14 Graduation
	No. 7 Graduation	1st corner 8
No. 2 Graduation	1st corner 64	2d corner 32
	2d corner 32	
1st corner10, 20, 50, 100	3d corner 16	No. 15 Graduation
2d corner 12, 24, 48	4th corner100	1st corner 10
3d corner 16, 32, 64	No. 10 Graduation	2d corner 20
4th corner 8	1st corner 32	3d corner 50
	2d corner 61	4th corner100
No. 4 Graduation	No. 11 Graduation	
	1st corner 61	No. 16 Graduation
1st corner	2nd corner100	1st corner 32
2d corner	No. 12 Graduation	2d corner 62
3d corner 16	1st corner 50	3d corner 50
4th corner 8	2d corner100	4th corner

BOXWOOD CALIPER, ONE FOOT, TWO FOLD RULES



PLATE 7029

No. 36½.—Square joint, two fold, 8ths, 10ths, 12ths and 16ths of inches; 1% inches wide; left hand caliper.

Note.—All caliper rules are regularly made with caliper left hand. When ordered with caliper right hand an additional charge of twenty-five cents per dozen net, will be made. The caliper of all caliper rules is regularly graduated in 16ths, but can be furnished in 32nds, without additional charge, if so ordered.

ZIG-ZAG RULES



PLATE 7030

SIX-INCH FOLD, CONCEALED JOINT, YELLOW ENAMEL

Number	02	03	04	04M	05	06	08
Lengthfeet Per dozenfeet	2 2 . 20	3 3.30	4 4.40	4 4 . 40	5 5.50	6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	8 8.80

SIX-INCH FOLD, CONCEALED JOINT, WHITE ENAMEL

Number	102	103	104	105	106	108
Length feet Per dozen	2 40	3 3 60	4 4 80	5 6.00	6 7.20	8 9 60

EXTENSION RULES

MAPLE, BRASS TRIM



PLATE 703

For measuring the distance between two fixed points.

Number	240	360	480	510	612
Length. feet Width inch Per dozen.	1	1	4-8 1 10.00	5-10	1



FILES AND RASPS



PLATE 5414

Inch	Inch ONE ROL				WO ROUND EDGES			Тарі	ERS	SLIM TAPER	
	Bas- tard	2d Cut	Sm'th	Bas- tard	2d Cut	Sm'th	Inch	Single Cut	Dble. Cut	Single Cut	Dble Cut
4	3.40	3.90	4.40	3.80	4.40	4.90	3	2.10	2.50	2.10	2.50
5	3.60	4.30	4.60	4.00	4.80	5.10	3 1/2	2.10	2.50	2.10	2.50
6	3.90	4.50	5.10	4.40	5.00	5.60	4	2.20	2.90	2.20	2.60
7	4.40	5.20	5.50	4.90	5.80	6.10	4 1/2	2.40	3.10	2.30	3.00
8	4.80	5.50	6.10	5.40	6.10	6.80	5	2.60	3.50	2.50	3.20
9	5.50	6.50	7.10	6.10	7.30	7.90	5 1/2	3.00	4.00	2.90	3.50
10	6.30	7.20	7.90	7.00	8.00	8.80	6	3.40	4.70	3.10	3.90
11	7.50	8.80	9.60	8.40	9.80	10.60	7	4.30	5.60	3.80	4.50
12	8.40	9.70	10.60	9.40	10.80	11.80	8	5.40	6.70	4.50	5.30
13	10.60	12.00	13.20	11.80	13.40	14.60	9	6.60	8.10	5.40	6.30
14	12.00	13.70	14.70	13.40	15.30	16.40	10	8.10	9.70	6.40	7.50
15	14.70	16.90	18.10	16.40	18.80	20.10	11	10.70	12.10	8.30	9.10
16	16.50	18.90	20.10	18.40	21.00	22.40	12	12.50	14.70	9.50	11.00
17	20.50	22.70	24.40	22.80	25.30	27.10	13	15.90	17.50	12.10	13.10
18	22.70	25.50	27.30	25.30	28.40	30.40	14	18.20	20,60	13.80	15.40

		dsaw & Taper		Pit Saw	Cant Saw	Cross Cut	Ноок Тоотн	PLANER KNIFE	IN- SERTER TOOTH OR
Inch	Reg-	GI	Inch	Single Cut	Single Cut	Single Cut	Single Cut	Single Cut	CHISEL TOOTH
	ular	Slim		4.80	4.30	4.80			
				5.40	4.70	5.40			
3	2.50	2.50	5	6.10	5.40	6.10	6.70		
3 1/2	2.50	2.50	5	7.00	6.10	7.00	7.70		
4	2.90	2.60	$\frac{6}{7}$ $\frac{8}{9}$	7.50	6.40	7.50	8.30	6.40	8.30
4 1/2	3.10	3.00	7	8.50	7.80	8.50	9.40		9.40
5	3.50	3.20	8	9.10	8.70	9.10	10.10	8 60	10.10
51/2	4.00	3.50		10.70	10.40	10.70	11.80		
4 ½ 5 5 ½ 6 7 8 9	4.70	3.99	10	11.80	11.40	11.80	13.00	12.10	.
7	5.60	4.50	11	C	limay a	day 2 in	on Hf R	d. Bastar	d
8	6.70	5.30	12					saw price.	
9	8.10	6.30			itounu O	differing,	take 110	saw price.	•
10	9.70	7.50		PATO	ENT DOT	DIE-EMDI	R WITH I	TANDIE	
11	12.10	9.10		1 AT	ENTDOO	BLE-ENDI	M WITH I	TANDLE	
12	14.70	11.00			1		The	Name Do	ouble-
13	17.50	13.10	7	8	9	10		nder is O	
14	20.60	15.40	3.50	3.90	4.40	4.90		rade Mar	

FILES AND RASPS

	Mili	AND Ro	DUND		FLAT		SQUARE			
Inch	Bastard	2d Cut	Smooth	Bastard	2d Cut	Smooth	Inch	Bastard	2d Cut	Smooth
4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	3.00 3.20 3.50 3.90 4.30 4.90 6.70 7.50 9.40 10.70 13.10 14.70 18.20 20.20 24.60 27.40	3.50 3.80 4.00 4.60 4.90 5.80 6.40 7.80 8.60 10.70 12.20 15.00 20.20 22.70 27.50 30.70	3.90 4.10 4.50 4.90 5.40 6.30 7.00 8.50 9.40 11.70 16.10 17.90 21.70 24.30 29.40 32.90	3.70 3.90 4.30 4.30 5.30 6.30 7.00 8.60 9.70 11.80 13.30 16.00 17.80 21.50 23.90 28.40 31.50	4.30 4.60 4.80 5.50 6.10 7.20 8.10 9.80 11.00 13.60 15.30 18.30 20.10 24.20 26.80 31.60 35.30	4.70 4.90 5.30 6.10 6.60 7.90 8.70 10.70 12.10 14.70 20.00 22.30 26.50 29.20 34.60 38.30	4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	3.80 4.10 4.60 5.10 5.50 6.60 7.40 9.10 10.20 12.50 13.90 16.90 22.50 25.10 29.70	4,60 4,80 5,10 5,80 6,30 7,70 8,50 10,40 11,50 14,30 16,10 19,20 21,20 22,20 33,20 33,20 36,70	4.90 5.30 5.50 6.30 7.00 8.30 9.10 11.30 12.80 15.40 20.90 23.30 27.50 30.40 35.70 39.30
Mill Mill Mill Mill Farn	Blunt, Dl Dbl. Cut. Narrow P Machine. Triangula ners' Ow st	oint	adv. 1 in		lunt) Di vance 2		Squa	re Blunt	, advar	nce 1 in

HAND AND PILLAR			Inch		ROUNI REE SQU		WARDING			
Bastard	2d Cut	Smooth		Bastard	2d Cut	Smooth	Bastard	2d Cut	Smooth	
3.70	4.30	4.80	4 5	4.80	5.60	6.10	4.00	4.80	5.40	
3.90	4.70	5.30		5.40	6.10	6.40	4.50	5.30	5.80	
4.30	5.10	5.60	6 7	6.10	6.70	7.10	4.90	5.90	6.40	
4.90	5.80	6.30	7	7.00	7.70	8.20	5.90	6.90	7.50	
5.40	6.30	6.70	8	7.50	8.30	8.90	6.40	7.50	8.20	
6.70	7.80	8.30	9	8.50	9.40	9.90	7.80	9.00	9.90	
7.50	8.70	9.40	10	9.10	10.10	10.70	8.70	10.10	11.00	
9.40	10.90	11.80	11	10.70	11.80	12.70	10.90	12.70	13.70	
10.70	12.30	13.50	12	11.80	13.00	13.90	12.30	14.30	15.40	
13.30	15.20	16.20	13	14.10	15.40	16.60	15.20	17.40	18.70	
15.00	17.00	18.20	14	15.50	17.00	18.30	17.00	19.40	21.00	
17.90	20.60	21.70	15	18.50	20.40	21.70				
20.10	22.80	24.20	16	20.60	22.50	24.20	Sto	vesaw		
24.20	27.10	28.60	17	24.70	27.00	28.90	8 inch 9.40			
26.80	29.90	31.50	18	27.50	29.90	32.00	o men		0.10	
31.90	35.40	37.60	19	32.80	35.70	38.10				
35.10	39.20	41.60	20	36.20	39.40	42.30				
Slotting	(Blt.) as	dv. 2 in.	Ginsa	w, take B	astard p	rice	Staves	aw Imp	roved	
Cotter I	Blunt o		Crossing.			adv. 2 in	6 inch		6.40	
advance 2 in. Reaper, advance 1 in. on			Tumbler	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		7 inch 7.40				
Reaper,	advance	1 in, on	Feather 1	Edge (Blu	nt):	8 inch 8.10				
2d Cut			High Ba	ek		9 inch 9.70				
			Half Rou	$\operatorname{ind}\dots$			10 inch			
							12 inch		. 15.40	



FILES AND RASPS

	H	ORSE RAS	SPS	FILE RASPS			Wood Files			
Inch	Plain	Bevel'd & ¾ Rasp	Tanged	Flat	Hf. Rnd.	Inch	Flat	Hf. Rnd.	Cabinet	
6 7 8 9				7.40	8.10	6	4.30	6.10	8.10	
7				8.60	9.30	7	4.80	7.00	9.30	
8				9.40	10.10	8	5.30	7.50	10.10	
9				11.40	12.20	9	6.30	8.50	12.20	
	9.40	10.70	12.80	12.80	13.70	10	7.00	9.10	13.70	
11	11.40	12.90	15.20	15.50	16.80	11	8.60	10.70	16.80	
12	12.80	14.40	16.80	17.50	18.70	12	9.70	11.80	18.70	
13	15.20	17.00	19.60	20.90	22,40	13	11.80	14.10	22,40	
14	17.80	20.10	23.10	23.20	24.80	14	13.30	15.50	24.80	
15	20.90	23.60	27.30	27.80	29.70	15	16.00	18.50	29.70	
16	24.40	27,50	32.20	30.80	32.90	16	17.80	20.60	32.90	
17	28.90	31.50		36.20	38.90	17	21.50	24.70	38.90	
18	32.90	36.20		40.90	43.60	18	23,90	27.50	43.60	

Inch	WOOD RASPS		Cabi-		Sı	HOE RAS	SPS		Knife		
	Flat	Hf. Rnd	net	Inch	Flat	Hf. Rnd.	Oval	Inch	Bas- tard	2d Cut	Sm't
6	7.40	8.10	10.10	6	8.10	8.10	9.30	4	5.40	6.10	6.40
6	8.60	9.30	11.70	7	9.30	9.30	10.10	5	6.10	6.70	7.10
8	9.40	10.10	12.80	8	10.10	10.10	12.20	6	6.90	7.50	7.90
9	11.40	12,20	15.50	9	12.20	12.20	13.70	7	7.80	8.50	8.90
10	12.80	13.70	17.50	10	13.70	13.70	16.80	8	8.50	9.10	9.50
11 12	15.50	16.80	20.70	11	16.80	16.80	18.70	9	9,40	10.60	11.30
	17.50	18.70	22.80	12	18.70	18.70	22.40	10	10.10	11.50	12.30
13 14	20.90	22.40	26.80	13	22.40	22.40		11	12.20	13.70	14.60
15	23.20	24.80	29.60	14	24.80	24.80		12	13.70	15.20	16.10
16	27.80	29.70	33.90					13	16.30	17.90	19.20
17	$30.80 \\ 36.20$	32.90	36.90					14	18.20	19.90	21.20
18	40.90	38.90	42.40		Last M	akers' I	Rasps				
10	40.90	43.60	46.90	1 inc	h adv.	on Cabii Lasp	net				

Sizes below 4 inches, not extended, take 4-inch price.

Half inches not specified, take next higher full inch price.

Dead Smooth, double the price of Bastard Cut.

One Round Edge, advance 12 1/2 per cent.

All lengths above those listed, advance 20 per cent. on next lower inch price.

Blunt Files not specified, advance one inch on respective kinds and cuts.

Single or Float Cut not specified, on regular shapes take Double Cut price.

Equalings (Bellied), advance two inches on respective kinds and cuts.

Two Round Edges, advance 25 per cent.

Files varying from standard sizes, subject to special prices.

Cuts not specified, made upon regular blanks, advance one inch on respective kinds and nearest cut.



STAR HACK SAW FRAMES



PLATE 8104 NO. 9

An extension frame holding blades from 8 to 12 inches in length.



PLATE 8105 NO. 25

A high grade frame at a small price. For 8 inch blades only.

Nickel platedper doz. 4.80



PLATE 8106 NO. 27

An extension frame for saws from 8 to 12 inches.

SOLID HACK SAWS



PLATE 8107

HACK SAW BLADES

Length of BladeInches	6	7	8	9	10	11	12
Price Per Gross	7.00	7.50	8.00	9.00	10.00	11.00	12.00

COMPASS SAWS



SizeInches	10	12	14	16	18
Per Dozen	4.25	4.50	4.75	5.00	5.25

STAR POWER HACK SAW MACHINE

It adapts itself to all kinds of work and cuts all shapes and sizes up to 4½ inches in diameter. It is self-feeding and stops automatically. It is arranged for blades either 10, 11 or 12 inches in length.

Six 12 inch blades are furnished with each machine.

The speed recommended is 45 strokes per minute.

Size of pulley, $13\frac{1}{2} \times 2\frac{1}{8}$ inches. Net weight, 168 pounds.

No. 89 machinee	ach 25.00
No. 90 machine, heavier t	han
No. 89 e	ach 35.00



PLATE 8109

KEYSTONE RATCHETS FOR SQUARE SHANK DRILLS ONLY



PLATE 5379

WESTON RATCHET

REGULAR

Length of HandleIn.	12	14	16	18
Price	7.60	8.00	8.75	9.75

BOILER MAKERS'

Length of Handle	.Inches	12	14
Price		7.60	8.00

PLATE 5380 REVERSIBLE BOILER RATCHET

_			
No. 31.	10-inch	handle	5.00
No. 32.	14-inch	handle	5.75
No. 33.	16-inch	handle	6.50
No. 34.	18-inch	handle	7.25
No. 35.	22-inch	handle	7.50
No. 36.	24-inch	handle	7.75
No. 37.	28-inch	handle	8.25

KEYSTONE REVERSIBLE RATCHETS FOR SQUARE SHANK DRILLS ONLY



PLATE 5381 SQUARE SLEEVE RATCHET

No. 1.	10-inch handle	
No. 2.	14-inch handle	5.78
No. 3.	16-inch handle	6.50
No. 4.	18-inch handle	
No. 5.	22-inch handle	7.50
No. 6.	24-inch handle	7.7.
No. 7.	28-inch handle	8.2.

No. 21.	10-inch handle 5.2
	19-men handle
No. 22.	14-inch handle 6.0
No. 23.	16-inch handle 6.7
No. 24.	18-inch handle 7.5
No. 25.	22-inch handle 7.7
No. 26.	24-inch handle 8.0
No. 27.	28-inch handle 8.5



THE CHAMPION "EASY" SCREW PLATE WITH TAP WRENCH

Notice.—Every set supplied with our Patent Adjustable Electric Tap Wrench. All our Taps are Machine Relieved.

WITH U. S. S. THREAD TAPS AND DIES.



PLATE 8002

FEATE 8002	
No. 1b, Plate Complete in Box. Length of Stock, 15½ inches. Cutting ½20, 5,618, 3,816, 7,714, 1,913. Weight 12 pounds	
No. 2b, Plate Complete in Rox Two Stocks 151/ 1 co	9.75
No. 5b, Plate Complete in Box Two Stocks 1517 and so	11.10
No. 51/b, Plate Complete in Box Two Stocks 15 1 and 20	13.00
No. 7b, Plate Complete in Box Two Stocks 151 20 pounds	15.75
No. 9b, Plate Complete in Box Two Stocks 151 and 25 pounds	21.15
$\frac{5}{16}$ 18, $\frac{3}{8}$ 16, $\frac{7}{16}$ 14, $\frac{1}{2}$ 13, $\frac{9}{16}$ 12, $\frac{5}{8}$ 11, $\frac{3}{4}$ 10, $\frac{7}{8}$ 9, 18. Weight 27 pounds.	23 65



PLATE 8003

. EATE 0003	
No. 51, Plate Complete in Box. With Adjustable Tap Wrench. Cutting \(\frac{1}{4}^{20}\), \(\frac{5}{16}^{18}\), \(\frac{3}{16}^{16}\), \(\frac{7}{16}^{14}\), \(\frac{1}{2}^{13}\). Weight 20 pounds	
No. 52. Plate Complete in Roy With Allies	10.50
No. 55, Plate Complete in Roy With All	12.80
10. 55 %, Plate Complete in Boy With All 15 bounds.	15.00
Io. 57. Plate Complete in Boy With Advisor 36 pounds.	18.20
o. 57 19. Plate Complete in Roy With A 1. Weight 40 pounds	24.40
$\frac{5}{16}$ 18, $\frac{3}{8}$ 16, $\frac{7}{16}$ 14, $\frac{1}{2}$ 13, $\frac{9}{16}$ 12, $\frac{5}{8}$ 11, $\frac{3}{4}$ 10, $\frac{7}{8}$, 18. Weight 45 pounds	27 00

Can be furnished with SAE or $\frac{1}{3\,2}$ over size V thread taps and dies, if specially ordered

DRILLS

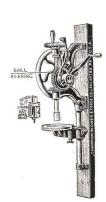


PLATE 8008 NO. 101 BALL-BEARING SELF-FEED DRILL



PLATE 8009 NO. 93 DRILL



PLATE 8010 CHAMPION HAND FEED AND QUICK RETURN; SELF FEED

PLATE 8008

No. 101 has one speed and is back-geared. Slotted lathe-turned table. Drills to center of a 12 inch circle. Spindle ½ inch in diameter, bored like Champion Patented Neverslip Chuck for ½ inch straight shank bits; if specially ordered, ¼ inch. Drills holes up to ¾ inch.

No. 101 Champion Self Feed Post Drill with Ball Bearings, weight 80 lbs. . . . each 7.00

PLATE 8009

No. 93 has two speeds; back gears with double journal bearings. All ground out of the solid metal. Drills to center of 15 inch circle. Spindle $1\frac{1}{2}$ inches in diameter, with up-and-down run of 3 inches. Bored for $1\frac{1}{2}$ inch straight shank bits; if specially ordered, $\frac{1}{2}$ inch. Drills holes up to $1\frac{1}{2}$ inches.

No. 93 Champion Self-Feed Blacksmith Post Drill with Ball Bearings, wgt. 125 lbs. 10.00 Extra for Power. 3.00

PLATE 8010

Cast iron frame, gearings, fly wheel and table; end thrust ball bearings; all bearings ground out of solid metal; meets many demands for Quick work of machine shops, railroad shops, etc.; drills to the center of 16½ inch circle. Drills holes up to 1¼ inches; lathe turned and slotted table; spindle 1½ inch diameter, has up-and-down run of 5½ inches, with Neverslip chuck to take ½ inch straight shank drills.

No. 97. Length of Board 46 inches; length of drill over all, 51 inches; diameter of fly wheel, 14 inches; length of crank, 12 inches; size of table 9 inches; weight, each 160 lbs.



Power Drills



PLATE 8000 20-INCH DRILL

O PLATE 8001
ILL NO. 0 POWER BENCH DRILL
_CHAMPION_20-INCH POWER DRILL

CHAMPION	20-INCH	POWER	DRILL
Height of drill.	a a common a new common a		75 in all 1
Distance between spindle and base.			······································
Diameter of crown gear	pindic		······ 10 ¼ inches
Diameter of crown gear Diameter of pinion gear Diameter of column			····· 5 4 inches
Diameter of column			3 1/4 inches
Traverse of table on column			·····b¼ inches
Diameter of table			······18½ inches
Diameter of spindle			····· 16 inches
Traverse of spindle			······································
Size of tight and loose pulleys			8 inches
Diameter of table on column Diameter of spindle. Traverse of spindle. Size of tight and loose pulleys. Size of cone pulleys (4 step) Speed of driving pulleys.			
Speed of driving pulleys			4, 5%, 7½, 9 x 2 in. face
Speed of driving pulleys. Floor space required (square base). Floor space required (round base)			300 R. P. M
Floor space required (round base) Horse power required			······ 16 X 46 inches
Horse power required			·····22 x 35 inches
Horse power required. Hole in spindle bored to fit Morse T	aper No. 4		
Champion 20 inch Back-Geared Upri	ight Power Dr	rill with San	aro Pogo Commists
Less Belts, weight 815 lbs Champion 20 inch Upright Power I less Back Gears, weight 800 lbs.	Bar I ower Di	m with byu.	
Champion 20 inch Upright Power I	Drill with Son	are Race C	omplete as shows
less Back Gears, weight 800 lbs. Champion 20 inch Upright Power D and Wheel Feed only, weight 70	- The mich Equ	and mase Ci	ompiete, as snown,
Champion 20 inch Upright Power D	rill with Son	are Rese Co	mplete with Lane
and Wheel Feed only, weight 77 Champion 20 inch Upright Power D	0 lbs.	are base co	
Champion 20 inch Upright Power D	rill with Saus	are Base Con	mplete with Lever
Feed only, weight 750 lbs	and soque	are Dube Co.	inpiece, with Lever
NO 0 7			92.00
NO. 0 PC	WER BE	NCH DR	ILL
Drills to center of circle.	50 YE SCHOOL AT 10 DO 1000 OF 10		0:1
Weight			100 11
Complete			each 20 00
The spindle is bored with No. 1	Morgo topon l	volo	

FORD CHAIN HOISTS



PLATE 7879 DIFFERENTIAL BLOCK



PLATE 7880 SCREW HOIST DUPLEX TYPE



TRIBLOC GEARED TYPE

DIFFERENTIAL. This is the simplest of all chain hoists, and where a hoist is required but occasionally and high efficiency and speed are not essential, it serves the purpose admirably. The Ford Differential Hoist is made with exceeding care and of the best material obtainable. It has drop-forged steel hooks and the best grade of chain.

SCREW HOISTS. For work where the highest speed and efficiency are not required we can furnish the Ford Duplex Type Worm Gear Hoist. While this type of hoist is not as efficient as the Tribloc, it is frequently preferred for portable use, as it is lighter in weight and at the same time powerful and durable.

TRI BLOC. The master piece of chain hoist construction. Has planetary type of spur gearing but unlike other spur geared types. Its gearing and working parts are of steel instead of cast iron, thereby increasing the life and strength of the hoist. The spur gear operating mechanism with steel gears, is more highly efficient than any other type and maintains its high efficiency throughout the life of the hoist.

Eighty per cent of the power applied to the hand chain of a tribloc is converted into lifting energy. An eighty-two pound pull of one man on the hand chain will lift a ton.

The patented Loop Hand Chain guide is an endless steel loop having fixed guiding

strips adjacent to the flanges of the wheel extending from one guide to the other and conforming to the circumference of the wheel. The loop hand chain guide has many advantages over the old style guide. It protects the hand wheel and saves the working parts of the hoist from damage. It prevents gagging of the hand chain. It permits rapid travel of the hand chain without overriding the flange.

The chains and hooks on the Triblocs are made from carefully selected steel stock and are subject to the most rigid inspection and test before they are attached to the hoist. The working parts of every Tribloc are guaranteed for five years.



FORD CHAIN HOISTS-CONTINUED

DIFFERENTIAL BLOCKS

Capacity Tons	1/4	1/2	1	1 1/2	2	3
Price, complete Extra Hoist per foot	2 80	21.00 2.80 7	28.00 3.00 8	36.00 3.20 8½	45.00 3.40 9	60.00 4.00 91/2

SCREW HOISTS-DUPLEX TYPE

CapacityTons	1/2	1	1 1/2	2	3	4	5	6	8	10
Price, complete	1.40	30.00	40.00	50.00	75.00	95.00	140.00	180.00	210.00	275.00
Extra Hoist per foot.		1.30	1.40	1.44	1.50	1.70	2.20	2.50	2.90	2.90
Hoist in feet		8	8	9	10	10	12	12	12	12

TRIBLOC-GEARED TYPE

Capacity	Tons	1/2	1	1 1/2	2	3	4	5
Price, complete Extra Hoist per foot Hoist in feet		. 90	45.00 .95 8		70.00 1.05 9	90.00 1.50 10	110.00 1.60	140.00 2.15 12
CapacityTons	6	8	10	12	16	20	32	40
Price, complete	2.15	200.00 2.70 12	240.00 3.25 12	300.00 4.30 12	340.00 5.40 12	$425.00 \\ 6.50 \\ 12$	Appli	n cation

PORTABLE FORGES AND BLOWERS



PLATE 7245 STEEL BLACKSMITH BLOWER



PLATE 7246 STEEL RIVET FORGE

PLATE 7245

The 400 Champion Steel Blacksmith Blower with the No. 400 Champion "Whirlwind" Blast Anti-Clinker Heavy Nest Tuyere Iron fan 12 inches in diameter, complete with piping, Blower weight 105 lbs., Tuyere Iron 50 lbs......

The 400 Champion Steel Blacksmith Blower is made for right- or left-hand fires. Right-hand Blowers always furnished unless otherwise specified.

PLATE 7246



PLATE 7247 STEEL RIVET FORGE



PLATE 7248 STEEL HORSESHOERS' FORGE

PLATE 7247

No. 404 Champion Steel Rivet Forge with Shield, Hearth 24 x 24 inches, height 30 inches, fan 9 inches in diameter, weight 170 pounds......

PLATE 7248

No. 408 Champion Steel Horseshoers' Forge with Half Hood. Hearth 30 x 36 inches, height 30 inches, fan 12 inches in diameter, with the No. 400 Champion "Whirlwind" Blast Anti-Clinker Heavy Nest Tuyere Iron. Weight 300 lbs.
 With Water Tank, extra.

 $65.00 \\ 5.00$

45.00

PORTABLE FORGES





NO. 45

PLATE 8005 NO. 42

Champion Lancaster Geared Agricultural Forge is the same in its direct gearing for making blast as the No. 40 Lancaster Geared Blower. This makes a well-built, low-priced, direct-drive forge, a good blast producer and is recommended for farmer's use.

27.00 No. 42 Champion Lancaster Geared Direct-Drive Agricultural Forge, Hearth 23 x 35 inches, Height 30 inches, Fan 12 inches in diameter, with Shield, weight 165 lbs. 36.00



PLATE 8006 NO. 78



PLATE 8007 NO. 150

The No. 78 Forge is substantially supplied with bushed journal bearings on both sides of the gears. All gears in the midway cross spiral gearing run smooth and noiseless. The midway or cross spiral gearing has no small gears or pinions. Gears run in a dust-proof casing. Crank turns in either direction.

No. 78 Midway or Cross Spiral Geared Steel Hearth Rivet Forge with Hearth 18 inches in diameter, Height 30 inches, Fan 10 inches in diameter, with Shield weight 135 lbs.... 31.00 No. 150 Champion Lever Forge with Shield, Hearth 18 inches, Fan 8 inches, weight



ASBESTOS LEAD JOINT RUNNER

TIME SAVER AND SURE JOINT MAKER FOR PLUMBERS, WATER AND GAS COMPANIES

It is adapted for soil, water or gas pipes, or a bell pipe of any description where a joint is poured with molten lead. Always ready, and not affected by heat or cold.

RED HOT LEAD DOES NOT AFFECT IT

This tool fills a long-felt want of something that would be easy to handle and convenient to apply, for making joints in bell pipe. The different sizes are applicable to any size of pipe from two inch to the largest pipe for water main.



PLATE 2024 NO. 1 SQUARE RUNNER APPLIED



PLATE 2025 NO. 2 SQUARE RUNNER APPLIED



PLATE 6927 NO. 3 ROUND RUNNER APPLIED



PLATE 6928 NO. 4 SQUARE RUNNER APPLIED

As Shown in Cut No. 4.

No. 1 Improved 34 inch Square, for 2, 3 and 4-inch Pipe	2.30
No. 2 Improved 34 inch Square, for 4, 5 and 6-inch Pipe	2.45
No. 3 Improved 1 inch Square, for 6, 8 and 10-inch Pipe	4.70
No. 4 Improved 1 inch Square, for 10, 12 and 14-inch Pipe	6.20

As Shown in Cuts Nos. 1 and 2.

	AS DIOWN IN COIS TOOS. I MAD 2.	
No	Improved 11/4 inch Square, for 8, 10 and 12-inch Pipe	9.65
No.	Improved 11/4 inch Square, for 10, 12 and 14-inch Pipe	10.70
No.	Improved 1¼ inch Square, for 16, 18 and 20-inch Pipe	13.80
	Improved 1¼ inch Square, for 24-inch Pipe	
	Improved 1¼ inch Square, for 30-inch Pipe	
No.	Improved 1 ¼ inch Square, for 36-inch Pipe	21.10
No.	Improved 1 1/4 inch Square, for 40-inch Pipe	22.35
No.	Improved 1 ¼ inch Square, for 42-inch Pipe	24.45
No	Improved 114 inch Square for 48-inch Pine	25 75

Cut No. 1 shows the 1¼ inch Square Joint Runner as applied to small sizes of pipe; cut No. 2 shows the 1¼ inch Square Joint Runner as applied to large sizes of pipe; cut No. 3 shows the Round Runner as applied; cut No. 4 show the ¾ and 1 inch Square Joint Runner as applied. Larger or special sizes made to order. Directions are sent with each Runner.



ASH CANS



PLATE 3212



PLATE 3213
GALVANIZED ASH CAN WITH
EIGHT WOOD STRAPS



PLATE 3214 PATENT CORRUGATED GALVANIZED STEEL ASH CAN



PLATE 3215
PATENT INDESTRUCTIBLE
ENGINEERS' ASH CAN



PLATE 3216
ENGINEERS' BLACK STEEL
ASH CANS—EXTRA HEAVY
Prices on Application



PLATE 3217 BLACK STEEL ASH CAN





NT-	PLATE 6987	T
No.		Net
	$\begin{array}{llllllllllllllllllllllllllllllllllll$	

GASOLINE FIRE POTS



PLATE 4282



PLATE 4283



PLATE 4284

No. 1 Seven Pints..... Each 13.60 No. 5 Five Pints

o. 5 Five Pints..... Each 10.40



PLATE 4285



PLATE 4286



PLATE 4287

No. 21 One GallonEach	9.60	No. 20	One GallonEach	6.80
No. 11 One GallonEach	8.80	No. 10	One GallonEach	6.00



GASOLINE TORCHES



PLATE 4276



No. 104 One Quart...........Each 7.20

No. 103 One Quart......Each

6.80



PLATE 4278



PLATE 4279

No. 19 One Pint......Each 6.40

No. 18 One Pint...... Each 6.00



PLATE 4280



PLATE 4281

No. 108 One Quart......Each 6.80

No. 107 One Quart......Each 6.40

FIRE POT REPAIRS



PLATE 2348
BURNER & SWIVEL
\$4.00 each



PLATE 2348A

PUMP COMPLETE 1.28 each

Pump Collar .15 each

FOR COIL FIRE POTS



One set of Cup leathers and Washers, 12 cents per set. Sets consists of one each cup leather for automatic pump plunger, pump collar, and filler plug leather washers.

.14 ea.

.48 ea.

.12 ea.

.40 ea.

.70 ea.



DIXON'S FLAKE GRAPHITE



PLATE 8110

Dixon's Flake Graphite has many valuable applications as a lubricant for cylinders, valves and bearings, either alone or mixed with oils and greases. It is also nearly indispensable to engineers and mechanics for coating gaskets and packing for pipe-fittings, etc.

Trade :	Nos.	Per	Case	Per Pkg
632	1 lb. paper can, (36 in case)		12.00	.40
633	5 lb. tin can, (10 in case)		16.00	1.78
634	10 lb. tin can, (5 in case)		15.50	3.28
644	25 lb. box			7.50
645	50 lb. box			14.00
646	100 lb. keg		per po	und .27
646 1/2	200 lb. keg		per po	und .26
647	400 lb barrel		nor no	und 95

SPECIAL GRAPHITE No. 635

This is a special grade of Dixon's pure flake graphite, ground to an impalpable degree of fineness. Used upon locomotive air brake mechanisms, typesetting machinery, light, close fitting bearings, spindles, bobbins and other delicate parts of textile machinery, automobiles, gas and gasoline engines, cyclometers, scientific instruments, etc.

1 lb.	cans.																		 									. 6	ac	ch		.75
5 lb.	cans.											 						on.	 									. 6	eac	ch	5	.25
10 lb.																																5.50
25 lb.																																.60
50 lb.	boxes	۸.	×				¥	200				 				 						¥				 	p	eı	rI	b.		.60
100 lb.	kegs a	in	d	la	rg	9	r.		4				2 1			 					-			2 1			p	ei	rI	b.		.60

DIXONS GRAPHITE PAINT

Made in four colors: Olive Green, Natural or Dark Gray, Dark Red and Black. A perfect protection of exposed metal and wood service, such as smokestacks, boiler fronts, inner surfaces of steam drums, steam heating pipes, fire escapes, trolley poles, ornamental iron fences, etc.

5 gallons in	kegs					 							. per	gallon	2.4
1 gallon in	pail.												per	gallon	2.5
½ gallon in	pail.												. per	gallon	2.6



PLATE 8111

PIPE-JOINT COMPOUND



PLATE 7179

No. 628.	1/4 Collapsible Tubes	2.25
No. 693.	1 lb. Package	.30
No. 694.	5 lb. Package	.27
	10 lb. Package	.23
	25 lb. Package	.21
	50 lb. Package	.20
	100 lb. Package Per Pound,	.20

CEMENTS



PLATE 7180

The SMOOTH-ON Cements are sold in tin cans like the above

Smooth-On Castings in yellow labeled cans. 1, 5, 10 and 25 lbs. Per Pound,	. 50
Smooth-On Iron Cements, No. 1 and No. 2, in blue labeled cans.	
1, 5, 10 and 25 lb	. 50
Smooth-On Rivet Cement, for ships' sides, white label, 10 lb. cans	
only	.50
Smooth-On Joints in red labeled cans. 1, 5, 10 and 25 lbs Per Pound,	.50
Smooth-On Elastic Cement in gray labeled cans. 1, 5, 10 and 20 lb. Per Pound,	.50
Smooth-On Tape	.50

ASBESTOS PIPE COVERING



PLATE 685 AIR CELL.



PLATE 686 MOULDED.



PLATE 687 FELT. 1-2 INCH THICK.

Price list on following page.



ASBESTOS CEMENTS



PLATE 688

These Cements are absolutely fireproof, good non-conductors, and give general satisfaction. They are made up of Asbestos Fibre, Pulp, Magnesia and other ingredients to make them stick well and finish nicely.

Prices on application.

PRICE LIST OF SECTIONAL PIPE COVERINGS AND FITTINGS

Size, Inside Diameter Inches	Covering per Lineal Foot	Elbows, Each	Tees, Each	Crosses, Each	Valves, Each
1/2 3/4	.22	.30	.36	.48	.54 .54
1 24	.24	.30	.36 .36	.48 .48	.54
11/4	.30	.30	.36	.48	.54
1 1/6	.33	.30	.36	.48	.54
$\frac{2}{2}$.36	.36	.42	.54	.60 .78
2 1/2	.40 .45	.42 .48	.48 .54	.60	.18
2 ½ 2 ½ 3 ½ 3 ½	.50	.54	.60	.80	1.20
4	.60	.60	.75	.95	1.50
4 1/2	.65	.72	.90	1.10 1.50	$\frac{1.85}{2.25}$
$\frac{4}{5}^{1/2}$.70 .80	.90 1.30	$\frac{1.20}{1.60}$	2.00	2.25
7	1.00	1.80	2.20	2.80	3.60
8 9	1.10	2.40	3.00	3.60	4.40
9	1.20	3.00	3.80	4.40	5.30
10 12	1.30 1.85	3.60	4.60	5.20	6.20

In order to prevent confusion we have but one price list for our different kinds of Coverings up to and including one inch in thickness,

ASBESTOS SHEET MILL BOARD



PLATE 3926

$\frac{1}{32}$ inch—2 pounds	$\frac{3}{32}$ inch— 6 pounds	1/4 inch—14 pounds
$\frac{3}{64}$ inch—3 pounds	1/8 inch— 8 pounds	3% inch—23 pounds
$\frac{1}{16}$ inch—4 pounds	$\frac{3}{16}$ inch—12 pounds	½ inch—27 pounds

We carry three grades: hard (No. 101), medium (No. 102), and soft (No. 103). Medium furnished unless otherwise specified.

LIST PRICE

Standard sizes and this	
ctandard sizes and thicknesses	2
Standard sizes and thicknessesper pound	•10
Asbestos Paper in Roll, $\frac{1}{32}$ to $\frac{1}{8}$ inch	
Aspestos Paper in Roll, 32 to 18 inch	1.00
per pound	.10

STEAM TUBE CLEANER



PLATE 7888

Number	1	2	3	4	5	6
Inside Diameter of Flue inches Price each Size Steam Connection inches Steam Hose per foot Ply Steam Hose	$\frac{1}{2}$	$ \begin{array}{r} 1\frac{3}{4}-2\frac{1}{2}\\ 8.00\\ \frac{3}{4}\\ .71\\ 4 \end{array} $	$ \begin{array}{r} 2\frac{3}{4} - 3\frac{1}{4} \\ 9.00 \\ 1 \\ 1.07 \\ 5 \end{array} $	$ \begin{array}{r} 3 \frac{1}{2} - 4 \\ 10.00 \\ 1 \\ 1.07 \\ 5 \end{array} $	4 ½-8 12.00 1 to 1 ¼ 1.07	15.00

The above prices are for cleaner without hose.

COGGESHALL STEAM TUBE CLEANERS



PLATE 7889

SizeInches	2	$2\frac{1}{4}$	$2\frac{1}{2}$	2 3/4	3	3 1/4	$3\frac{1}{2}$	4	4 1/2	5	6
Priceeach	9.50	9.50	9.50	9.50	10.00	10.00	10.00	10.50	10.50	10.50	10.50

The above prices are for the steam cleaner complete without hose.

ROLLER TUBE EXPANDERS



PLATE 7890

DiameterInches	1	1 1/4	1 1/2	1 34	1 7/8	2	2 1/8
Price Each	10.00	10.00	10.00	10.00	10.00	10.00	12.00
Diameter Inches	$2\frac{1}{4}$	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4
PriceEach	12.00	14.00	16.00	18.00	20.00	23.00	25.00
Diameter Inches	4	4 1/4	4 1/2	5	5 1/2	6	
Price Each	30.00	35.00	40.00	50.00	55.00	60.00	



ENGINEERS' FAVORITE FLUE CLEANERS



PLATE 802

SizeInches	1 34	2	21/4	$2\frac{1}{2}$	2 3/4	3	3 1/4	3 1/2	3 3/4	4	4 1/2
PriceEach		-				-		-			

INGALLS' TUBE CLEANERS



PLATE 803



DIATE BOA

WITH BRUSH

SizeInches	2	21/4	21/2	23/4	3	31/4	3 1/2	4	4 1/2	5	6
Price Each With Brush. Each	$\frac{2.00}{2.50}$	$\frac{2.25}{2.85}$	$2.50 \\ 3.15$	$2.75 \\ 3.45$	$\frac{3.00}{3.75}$	$\frac{3.25}{4.05}$	$\frac{3.50}{4.40}$	$\frac{4.00}{5.00}$	$\frac{4.50}{5.65}$	$5.00 \\ 6.25$	$\frac{6.00}{7.50}$

SPIRAL WIRE FLUE BRUSHES



PLATE 805

SizeInches	1	1 1/4	1 ½	1 34	2	21/4	2 1/2	23/4
BlackEach	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75
SizeInches	3	31/4	3 1/2	4	4 1/2	5	6	
BlackEach	3.00	3.25	3.50	4.00				

FINE STEEL WIRE FLUE BRUSHES



PLATE HOS

ABRAMS' FLUE BRUSHES



PLATE 807

1 to 6 mehes..... per inch, 1.60 | 1½ to 6 inches per meh, 1.00

WATER TUBE CLEANERS



PLATE 5411

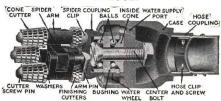


PLATE 5411A

Ball Bearing Water Driven Turbine Cleaner is especially adapted for general all around use in cleaning boiler tubes. These cleaners are designed for water pressure of 150 pounds or more, but they will work satisfactorily with less pressure, depending on scale conditions.

The construction of the cleaner is very simple, and it is operated with ordinary 1½ inch water hose. The water enters the rear end of the case through operating hose, and passes through the ports where it is directed onto the vanes of the water wheel imparting high rotative speed to the cutter head. The water then passes out through the front of the cleaner and washes out the loose scale.

No. 29	For 2 inch straight tubeseach	40.00
No. 30	For $2\frac{1}{2}$ inch straight tubeseach	40.00
No. 71	For 3 inch straight and 3 ¼ inch curved tubes each	40.00
No. 72	For 3½ inch straight tubeseach	50.00
No. 73	For 4 inch straight tubes each	50 00

HEATER BRUSHES



PLATE 5412

Duplex double brush trimmed flat on two sides. Practically two brushes joined together on the top, making a firm substantial brush.

No	107	108	109		
Brush part. Per dozen.	1 5/8 x 4 x 4 1/2	2½ x 6 x 5	3 1/4 x 6 5/8 x 4		
	9.00	10.00	13 . 00		

HAIR FELT



PLATE 7891

n Bales of about 300 square feet each,	¼ in. thickPer Sq. Foot,	.07
n Bales of about 300 square feet each,	½ in. thick Per Sq. Foot.	.08
n Bales of about 300 square feet each, n Bales of about 300 square feet each,		.09 1
in Dates of about 500 sunare feet each	1 1/2 in thick Den Co. Den	.11
		.13!
n Bales of about 300 square feet each,	2 in. thick Per Sq. Foot	. 21

OAKUM



PLATE 7892

LAMP WICK



PLATE 7893

Prices on Application

ASBESTOS WICK PACKING



PLATE 7894

Standard Achestes Wills Deal:	
Standard Asbestos Wick Packing	.50
Canadax Asbestos Wick Packing	=0

COTTON WASTE



PLATE 8112

Prices on all our own Brand Wastes on application.

RELIANCE HOSIERY The best grade of waste. It is manufactured from waste

ends of hosiery and absolutely contains no oil, dirt or short ends.

PEERLESS WHITE The purest and most absorbent

PEERLESS WHITE The purest and most absorbent white waste on the market.

Manufactured from clean cotton. It is entirely free from

dirt or any foreign matter. Contains only longest fibre.

ELK. WHITE A good long fibred waste. Absolutely pure and clean, but of a slightly lower absorbent quality than Peerless.

LION. WHITE A good white long fibred waste for general service.

RELIANCE COLORED A good grade of colored cotton waste.

All waste put up in bales of 100 to 500 lbs. For smaller bales an extra charge will be made.

MANILLA ROPE



PLATE 8113

Price on application

 $\frac{3}{16}$ —2c extra. $\frac{7}{4}$ —1 $\frac{1}{2}$ c extra. $\frac{5}{16}$ —1 $\frac{1}{2}$ c extra. $\frac{7}{16}$, $\frac{1}{2}$, $\frac{9}{16}$, — $\frac{1}{2}$ c extra. $\frac{7}{2}$ 6 to $\frac{1}{2}$ —Base.



BABBIT METALS

As manufacturers of this product we stand back of every pound of Babbit Metal made by us. We guarantee it to be made from nothing but new metals and therefore from dross.



PLATE 8104

GENUINE BABBIT is manufactured from the original Genuine Babbit formula with great care to preserve the purity of its constituents. It has a high content of Tin and is toughened and tempered with copper. It is adaptable for all kinds of important bearings where the service is hard, the speed great and the pressure heavy. Will not flake or crumble. Withstands all shocks or vibrations. Made for excessive or severe service.



PLATE 8105

"RELIANCE." The best general service Babbit made. Can be used in all cases where Babbit can be used. It is extremely tough and easy to pour. While slightly greater in cost than the so-called anti-friction metals its strength, high lubricating qualities, fluidity and freedom from dross after repeated melting causes the best engineers to pronounce it the most economical to use.



PLATE 8106

"PEERLESS." Equal to so-called anti-friction metals. Recommended for every class of ordinary bearings.



PLATE 8107

Numbers 1, 2, 3, 4, manufactured by our own formulas are very much superior to the so-called Hardware Babbits. Have all the qualities that make up the better class of Babbit.

SPECIAL. As manufacturers we make a great deal of Babbit to special formulas. If you have a special mix or kind that you wish, let us make it for you.



SOLDER

For many years we have manufactured solders, and have brought our products to the highest grade of quality. We use only new Straits Tin and New American Pig Lead. All foreign matter, such as antimony, tallow, etc., which are used by most manufacturers to give their product a clean bright appearance, but which is detrimental to good solder, is eliminated. We absolutely guarantee our product.



PLATE 8108

S. M. & S. CO. PERFECT. Especially made for the most exacting work. Has a large percentage of tin which makes it flow smoothly and evenly. This is the most economical to use on account of its superior quality.



PLATE 8109

SPECIAL. A good general service solder, clean and well made, but does not have the smooth flowing quality found in PERFECT.



PLATE 8110

LEADER. Of a lower grade than our other makes, but is recommended where a medium grade solder is required.



PLATE 8111

S. M. & S. CO. WIPING. The highest quality of Wiping Solder. Free flowing and economical.

SPECIAL. We make a specialty of manufacturing solder to special formula. If you wish this made up for you we will be very glad to submit prices.



SHEET LEAD



PLATE 8114

APPROXIMATE THICKNESS AND WEIGHT OF SHEET LEAD PER SQUARE FOOT

		40/11/2	
1/64 in.	1 lb.	3/32 in.	6 lbs.
1/32 in.	2 Ibs.	1/8 in.	-
1/24 in.	2½ lbs.	1/8 III.	8 lbs.
3/64 in.	3 Ibs.	5/32 in.	10 lbs.
1/16 in.	4 lbs.	3/16 in.	12 lbs.
5/64 in.	5 lbs.	1/4 in.	16 lbs.
		The second secon	TO TOS.

PIG LEAD

BLOCK TIN



PLATE 8115



PLATE 8116

INGOT LEAD



PLATE 8117

We charge market rates for metals. Will name prices on application.

LEAD PIPE

AAAEx. Ex. Strong
AA Ex. Strong
AStrong
B Medium
CLight
D Ex. Light
E Aqu'df



PLATE 8118

LIST OF SIZES. WEIGHT PER FOOT

LIS	SI OF	SIZES.	WEIGHT PER	rooi	
Calibre of Pipe Inches	Weight per Foot Pounds	Average Length of Coils Feet	Calibre of Pipe Inches	Weight per Foot Pounds	Average Length of Coils Feet
\$\\ \frac{3}{3}\) \(\text{C} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	12 oz. 1	100 125 100 85 135 125 140 120 100 70 125 85 100 85 75 60 80 65 85 70 60 45 65 50	1 1/4 A	4 3 4 3 4 5 3 4 4 3 4 5 5 6 1 5 6 1 5 6 7 8 1 5 6 7 8 9 11 3 4 4 3 4 6 7 8 9 13 16 20 10 15 18 22	45 35 25 50 45 40 42 32 25 20 30 35 30 25 23 20 12 12 12 12 12 12 12 12
1 B. 1 A. 1 AA 1 AAA 1 ¼E 1 ¼D 1 ¼C 1 ¼B	3 1/4 4 4 3/4 6 2 2 1/2 3 3 3/4	65 50 45 40 50 50 45 55	4 E 4 D 4 C 4 B 4 ½ 4 ½ 5 5 5 5 5	5 6 8 13 14 18 20 31	12 12 12 12 12 12 12 12 12 12

Special sizes to order.

PURE BLOCK TIN PIPE

1/8 in., 1 1/2 oz. per foot.

1/4 in., 3, 3 1/2, 4, 5, 6, and 8 oz. per foot.

3% in., 4, 5, 6, 6½ and 8 oz. per ft. ½ in., 4, 4½, 5, 5½, 6, 8 and 10 oz. per foot.

5% in., 8, 9, 10, 12 and 16 per oz foot



34 in., 10 and 12 oz. per foot. in., 15 and 18 oz. per foot.

1 ¼ in., 1 ¼ and 1 ½ lbs. per foot

 $1\,\frac{1}{2}$ in., 2 and $2\,\frac{1}{2}$ lbs. per foot.

in., 3 lbs. per foot.

WILLIAMS' "AGRIPPA" TOOL HOLDERS

THE HOLDERS THAT HOLD





"Agrippa" Hex. Head Cam and Drop-forged Semifinished Wrench.



PLATE 8060
"Agrippa" Headless
Cam and Wrought
Steel Wrench.



PLATE 805

PLATE 8061

INTRODUCTION.

Unusual precaution has accompanied the development of this line of Holders. Every detail has been tested and given closest possible attention. Materials best adapted to each of its parts have had every consideration and variety of test. The design, with the thought of its fullest utility and non-obstructive character, has had abundant and purposeful care.

The Holders or Shanks, all drop-forged from a strong, tough grade of carefully selected steel, are submitted to a special heat-treatment or refining process, after forging, which develops resistance to all wear and the great strength necessary to overcome the pushing thrust imposed upon the cutters. The cutter-holding channel provides an unusually strong seat for cutter and great resisting qualities for the work imposed upon this portion of Holder—a fundamental requirement in tool-holder efficiency.

The "Agrippa" Cam-fastening which features the Turning, Cutting-off and Side and Threading-tool Holders is furnished from hardened and tempered crucible tool steel in either Headless or Hex Head form. This simple and most efficient fastening largely eliminates the trouble and faults common to other holders. It is indestructible, provides for strength 25 to 50 per cent. greater than that of fastenings used similarly and removes the repair and replacement necessities so common in other varieties of holders.

The "Agrippa" Bar Cutters made from High Speed, etc., Steels of selected grade and cut to the "diamond point" form or bevel. They thus provide for the most common requirements with a minimum of grinding for either right or left hand usage; also the full extent of economical service that distinguishes this superior line of tool holders.

Special features of superiority and individuality applying to each Holder are detailed on their respective tool pages immediately following.

WILLIAMS' "AGRIPPA" TURNING-TOOL HOLDERS

With Right and Left Hand Offset and Straight Shanks



PLATE 8062



PLATE 8063

Furnished with either Cam, Hardened Wrench and one Cutter.

Both types of Cam are interchangeable, and extra Cams can be furnished at a slight extra charge.

The form in which Cutters are furnished requires the minimum of grinding for either right or left hand usage.

Unless otherwise specified Hex Head Cam will be furnished.

			1		Price	
No.	No.	Holder, Size	Cutter Size	Inter-	Cutter Only	Complete Tool
Left Hand	Right Hand		Sq.	change able Cams, Extra	High Speed	With High Speed Cutter
00-L	00-R	5 X 34 X 434 38 X 78 X 512	3 16	. 60	.15	1.70
0-L	0-R	3/8 x 7/8 x 51/2	1/4	.66	.22	1.80 2.05
1-L	1-R	1/2 x 1 1/8 x 63/4 5% x 1 3% x 8	36 1/4 56 3/8 76 1/2 5/8 3/4	. 73	.60	2.65
2-L 3-L	2-R 3-R	5/8 x 13/8 x 8 3/4 x 15/8 x 9 1/4	78	.90	.90	3.50
4-L	4-R	7/8 x 1 3/4 x 10 1/4	1/2	1.00	1.30	4.45
5-L	5-R	1 x 2 x 12 ½	5/8	1.10	2.35	5.70
6-L	6-R	1 1/4 x 2 1/4 x 14 1/4		1.20	3.85	8.50
		STRAIG				
00-S		$\frac{5}{16}$ x $\frac{3}{4}$ x $4\frac{1}{2}$	16	. 60	.15	$1.70 \\ 1.80$
0-S		3/8 x 7/8 x 5	1/4	. 66	.22	2.05
1-S 2-S		$\begin{array}{cccccccccccccccccccccccccccccccccccc$	16	.81	.60	2.65
2-S 3-S		58 x 138 x 7 34 x 158 x 8	78	.90	.90	3.50
4-S		7/8 x 1 3/4 x 9	1/2	1.00	1.30	4.45
5-S	1	1 x 2 x 11	3 16 1/4 56 3/8 16 3/8 16 1/2 5/8 3/4	1.10	2.35	5.70
6-S		1 1/4 x 2 1/4 x 14 1/4	3/4	1.20	3.85	8.50



WILLIAMS' "AGRIPPA" DROP-HEAD TURNING-TOOL HOLDERS

With Right and Left Hand Offset and Straight Shanks





PLATE 8065

Furnished with either Cam, Hardened Wrench and one Cutter.

Designed for use on Lathes with Clamp-tool Rests and low centers, and excellently adapted for Shaper and Planer work.

Both types of cams are interchangeable, and extra Cams can be furnished at a slight extra charge.

The form in which Cutters are furnished requires the minimum of grinding for either right or left hand usage.

Unless otherwise specified Hex Head Cam will be furnished.

*				Height	Price		
No. Left	No.	Holder, Size	Cutter Size, Square	from Bottom of Shank	Inter- change- able	Cutters	Comp. Tool
Hand	Hand		Square	to Cutter Point	Cams, Extra	High Speed	With High Speed Cutter
0200-L 200-L 201-L 202-L 204-L	0200-R 200-R 201-R 202-R 204-R	76 x 16 x 6 16 x 16 x 7 34 x 78 x 8 78 x 1 x 9 11/8 x 11/4 x 11	3 16 1/4 4 5 16 3/8 1/2 GHT SH	9 16 16 16 16 16 16 176 176	.60 .66 .73 .81 1.00	.15 .22 .35 .60 1.30	1.80 2.15 2.75 3.60 5.65
0200-S 200-S 201-S 202-S 204-S		76 x 96 x 6 916 x 116 x 7 34 x 18 x 8 78 x 1 x 9 1 18 x 1 4 x 11	3 16 1/4 5 16 3/8 1/2	9 16 11 16 13 16 15 16 15 16	.60 .66 .73 .81	.15 .22 .35 .60	1.80 2.15 2.75 3.60 5.65



WILLIAMS' "AGRIPPA" CUTTING-OFF AND SIDE-TOOL HOLDERS

For Interchangeable Blades Right and Left Hand Offset and Right Hand Straight Shanks.



PLATE 8066



PLATE 8067

Furnished with either Cam, Hardened Wrench and Blade.

Both types of Cam are interchangeable, and extra Cams can be furnished at a slight extra charge.

The Cutter Blades are furnished from High Speed Steel and ground ready for use.

Unless otherwise specified, a High-Speed Steel Cutting-off Blade and Hex Head Cam will be furnished with the Holder.

			Cutter	Blade,		Pı	rice	
1		Finished		1		Complete	Holder	
No. Left	No.	Holder Size	Cutting-	ze	Extra Cutting- off Tool	Extra Side- Tool	With Cutting- off Tool	With Side- Tool
Hand	Hand	DILO	off	Side	Blade	Blade	Blade	Blade
			Tool	Tool	High Speed	High Speed	High Speed	High Speed
030-L 30-L	030-R 30-R	⁵ / ₁₆ x ²⁵ / ₃₂ x4 ½ ³ / ₈ x ¹⁵ / ₁₆ x5 ½	$\frac{5}{64}X$ $\frac{1}{2}$ $\frac{3}{32}X$ $\frac{5}{8}$	$\frac{1}{8}$ X $\frac{1}{2}$ $\frac{5}{32}$ X $\frac{5}{8}$.60	.60 .85	1.90 1.90	$\frac{1.90}{2.15}$
31-L 32-L	31-R 32-R	$\frac{1}{2}$ x1 $\frac{3}{16}$ x6 $\frac{1}{4}$ $\frac{5}{8}$ x1 $\frac{3}{8}$ x7 $\frac{1}{4}$	1/8X 3/4 1/8X 7/8	$\frac{3}{16}X$ $\frac{3}{4}$ $\frac{1}{4}X$ $\frac{7}{8}$	1.30	$\frac{1.40}{2.30}$	$ \begin{array}{c c} 2.15 \\ 2.75 \\ 3.60 \end{array} $	$\frac{2.70}{3.75}$ $\frac{5.00}{5.00}$
33-L *34-L	33-R *34-R	$\frac{3}{4}$ x1 $\frac{5}{8}$ x8 $\frac{1}{2}$ $\frac{7}{8}$ x1 $\frac{3}{4}$ x9 $\frac{1}{2}$	$\frac{\frac{3}{16}x1}{\frac{3}{16}x1}$	$\frac{5}{16}$ x1 $\frac{3}{8}$ x1 $\frac{1}{8}$	$\begin{bmatrix} 2.15 \\ 2.75 \end{bmatrix}$	$\frac{3.55}{4.50}$	4.50	6.25
10000111100122		RIGHT	HAND S	TRAIGE	IT SHAN	KS ——		
020-R 20-R		$\frac{5}{16}$ X $\frac{25}{32}$ X4 $\frac{5}{8}$ $\frac{3}{8}$ X $\frac{15}{16}$ X5 $\frac{1}{4}$	$\begin{bmatrix} \frac{5}{64}X & \frac{1}{2} \\ \frac{3}{32}X & \frac{5}{8} \end{bmatrix}$	$\frac{1}{8}$ X $\frac{1}{2}$ $\frac{5}{32}$ X $\frac{5}{8}$.60	$\frac{60}{.85}$	1.90 1.90	$\frac{1.90}{2.15}$
21-R 22-R		$\frac{1}{2}$ x1 $\frac{3}{16}$ x6 $\frac{1}{4}$ 5/8x1 $\frac{3}{8}$ x7 $\frac{1}{4}$	1/8X 3/4 1/8X 7/8	$\frac{3}{16}X$ $\frac{3}{4}$ $\frac{1}{4}X$ $\frac{7}{8}$.85 1.30	$\frac{1.40}{2.30}$	$\frac{2.15}{2.75}$	$\frac{2.70}{3.75}$
23-R *24-R		$\frac{3}{4}$ x1 $\frac{5}{8}$ x8 $\frac{1}{2}$ $\frac{7}{8}$ x1 $\frac{3}{4}$ x9 $\frac{1}{2}$	$\frac{\frac{3}{16}x1}{\frac{3}{16}x1\frac{1}{8}}$	$\frac{\frac{5}{16}}{\frac{3}{8}}$ x1	2.15 2.75	$\frac{3.55}{4.50}$	3.60 4.50	$\frac{5.00}{6.25}$

*Extra heavy cutting-off blades $\frac{1}{4}$ x $1\frac{1}{8}$ inch, fitting 34-R, 34-L and 24-R can be furnished. List price 4.00 each.



WILLIAMS' "AGRIPPA" BORING-TOOL HOLDERS

For Multiple Bars



PLATE 8090



PLATE 8091 PLAIN BAR

Furnished with either Plain or Sleeve Bar, 1 each 45° and 90° Cutter and Hardened Wrenches.

With this excellent Holder, encumbering Sleeves or Bushings are unnecessary for interchangeable bars. Commercial forms of bar steel are adaptable without machining.

The Sleeve-bar fastening provides for the rapid adjustment of either straight or angular Cutters without the use of extra parts; it has greater strength than others of the same general design. Plain Bar provides for use with either Straight or Angular Cutters in the simplest manner possible, and is furnished with Headless Set Screws.

Unless otherwise specified maximum size Sleeve-bar will be furnished.

				Pr	ice
	Holder,	Holder	Standard	Complet	e Holder
No.	Size	Capacity for Bars, Size	Bar Size	With Plain Bar	With Sleeve Bar
000				High Speed Cutters	High Speed Cutters
080 80 81 82 83	56 X 34 38 X 78 12 X 1 18 58 X 1 38 34 X 1 58	3 to 1/2 1/4 to 5/8 1/4 to 3/4 3/8 to 15/6 1/2 to 11/8	1/2 5/8 3/4 116	2.90 3.05 3.65 4.70 6.75	3.25 3.45 4.10 5.40

Cutter and bar details on following page.



WILLIAMS' "AGRIPPA" KNURLING-TOOL HOLDER

With Universal Revolving Head



PLATE 8084
Coarse Medium Fine
Half-size knurling
corrugations.



PLATE 8085

A fitting companion of sturdiness and service in the "Agrippa" Tool Holder line.

The Knurls, fitted in a revolving head, provide for course, medium and fine work, and a minimum of time losses common in changing them. Like the pins or axles, they are made from hardened and tempered Crucible Tool Steel. Furnished with three pairs of Knurls as illustrated.

NT 1	II.llan Cine	Standard Knurls	Price		
Number	Holder, Size	Size	Knurls Pair	Complete Holder	
11-K	½ x 1 1/8 x 6 5/8	3 X 3/4	.75	6.00	

BORING BARS AND CUTTERS FOR "AGRIPPA" BORING-TOOL HOLDERS

2.	1		1			Price	
"Agrippa"		For use Cutte		ers	Cutters	Complete Bar	
Boring Approxin	ate Size	with			only	Plain	Sleeve
Plain	Sleeve	Holder No.	Size	For use at Angles of	High Speed	High Speed Cutters	High Speed Cutters
½ x 8½	½ x 75/8	080-83	$\begin{cases} \frac{3}{16} x1 \\ \frac{3}{16} x1 \frac{1}{2} \end{cases}$	90° 45°	.10	1.30	1.65
5/8 x 10 1/8	5/8 x 9 1/8	80-83	$\begin{cases} \frac{3}{16} x1 \\ \frac{3}{16} x1 \end{cases}$	90° 45°	.10	1.40	1.80
$\frac{3}{4}$ x $12\frac{1}{8}$	3/4 x 11	81-83	14x1 1/4 1/4x2	90° 45°	.15	1.80	2.25
$\frac{15}{16}$ x $14\frac{1}{8}$	$\frac{15}{16}$ x $13\frac{1}{4}$	82-83	$\begin{cases} \frac{5}{16} x 1 \frac{1}{2} \\ \frac{5}{16} x 2 \frac{1}{2} \end{cases}$	90° 45°	.24	2.60	3.30
1½ x 16¾	1 ½ x 16	83	3/8x1 7/8 3/8x3	90° 45°	.35 .55	3.75	4.60

WILLIAMS' "AGRIPPA" PLANING-TOOL HOLDERS





PLATE 8088
The substantial Bolt fastening-parts, and serrated adjustment ring.

The construction affording most ready release of cutter for adjustment.

The serrations in Holder indicating maximum of cutter adjustment.



PLATE 8087

PLATE 8089

Furnished with One Cutter and Hardened Drop-forged Wrench.

A rugged substantial tool of absolute efficiency and great dependability on either Lathe or Planer. Because of its numerous angles of adjustment it also makes an excelent Offset Turning Tool.

The construction assures perfect seat and holding qualities for the Cutters; the convex face of Clamp Nut provides uniform locking pressure for Cutters of either square or rectangular form; the serrations in holder provide for quicker, finer and maximum number of Cutter adjustments.

The serrated washer, or Adjustment Ring, which receives fastening and working impact, is hardened and tempered—relieves Holder of wear.

				Price	
No.	Holder, Size	Cutter Size	Adjust- ment	Cutters Only	Complete Holder
			Ring, Extra	High Speed	High Speed Cutters
91 92	1/2 x 1 x 7 5/8 x 1 1/4 x 8 1/2	14 X 38 5 X 7 16 X 7	.40	.35	3.00
93 94 95	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3/8 X 1/2 1/2 X 3/4	. 45 . 55 . 70	.80 1.95	3.90 5.10 8.05
96 97	$1\frac{3}{8} \times 2 \times 16\frac{1}{2}$ $1\frac{3}{4} \times 2\frac{3}{8} \times 19$ $2\frac{1}{8} \times 2\frac{3}{4} \times 22$	5/8 X 7/8 3/4 X 1	1.00 1.50	$\frac{3.35}{5.25}$	12.50 19.50
	2/8 A 2/4 X 22	7/8 x 1 1/8	2.25	8.20	29.70



WILLIAMS' "AGRIPPA" THREADING-TOOL HOLDERS

With Lockable-Spring Head



PLATE 8086

Furnished with Special Headless Cam Lock Nut, Alloy Steel Cutter and Hardened Wrench.

A highly perfected tool for fine or coarse threading or other Lathe work. The nut for Lockable-Spring Head provides for the perfectly rigid backing required for coarse threading and heavy cuts, and when it is loosened the Holder becomes a spring-tool for finishing work. It is equally excellent used as a Turning-tool Holder, for which purpose the High Speed Cutters furnished with the Turning-tool Holders can be supplied.

The Cam-fastening is always rapid and positive—the greater the pressure the tighter the lock. It offers full freedom for operation without removal from tool post and opposes no obstruction to cutting facilities. Extra Cams can be furnished at a slight extra charge.

The Cutter, made from highest grade of Alloy Steel, is ground all over to special size, the point forming an angle of 60°.

			Price		
Number	Holder, Size	Cutter Size Square		Complete Tool	
50 51 52	3/8 x 7/8 1/2 x 1 1/8 5/8 x 1 3/8	1/4 5 16 3/8	.45 .55 .70	2.25 2.75 3.50	

TEMPORARY LIST OF ALL SIZES

HIGH SPEED STEEL CUTTERS

WILLIAMS' "AGRIPPA" TOOL HOLDERS

On the following page we print a temporary list established to meet the present unprecedented conditions in the High Speed Steel market, from which we expect a discount can be permanently quoted.

Three feet lengths will be quoted upon only as our supply permits. The furnishing of Self-Hardening Steel in all forms will be discontinued with the exhaustion of our present supply.



WILLIAMS' AGRIPPA" TOOL HOLDER STEEL



In Cutter Lengths to fit "Agrippa" Tool Holders. Require minimum of grinding only, for use in Holders. All High Speed Steel Cutters are hardened.

For	Turning-	Tool Holde	ers	For "Agrippa" Boring Bars					
No.	Cutte	er, Size	Price High	"Agrippa"	For use			Price	
	Square	Length	Speed	Bar	at Angle	Sq're	L'gth	High Speed	
00 and 0200 0 and 200 1 and 201 2 and 202 3 4 and 204 5	3 16 16 3/8 76 1/2 5/8 3/4	17/88 23/88 27/88 33/8 41/8 43/4 51/2	.15 .22 .35 .60 .90 1.30 2.35 3.85	1/2 5/8 3/4 15	\$90° \$45° \$90° \$45° \$90° \$45° \$90°	3 16 3 16 3 16 3 16 3 16 14 14 14 14 14 5 16	1 1½ 1 1½ 1¼ 1¼ 2	.10 .12 .10 .12 .15 .19	
Cutters of about turning w	ove sizes a	re also ada	anta ble	1 1/8	\$90° \$45° \$90° \$45°	1/4 1/4 5 16 5 16 3/8 3/8	$1\frac{1}{2}$ $2\frac{1}{2}$ $1\frac{7}{8}$.24 .32 .35	





PLATE 8072

PLATE 8073

For (Cutting-off Tool Hol	lders	For Side-Tool Holders			
No.	*Cutter Blade, Size	Price High Speed	No.	*Cutter Blade, Size	Price High Speed	
020 & 030 20 & 30 21 & 31 22 & 32 23 & 33 24 & 34	54 x 1/2 x 45/8 32 x 5/8 x 51/8 1/8 x 3/4 x 61/8 1/8 x 7/8 x 7/8 1/8 x 1/8 x 91/2	.60 .60 .85 1.30 2.15 2.75	020 & 030 20 & 30 21 & 31 22 & 32 23 & 33 24 & 34	1/8 x 1/2 x 4/5/8 5/2 x 5/8 x 5/1/8 1/4 x 1/8 x 7 1/4 x 1/8 x 7 1/4 x 1/8 x 7 1/4 x 1/4 x 9/1/4	.60 .85 1.40 2.30 3.55 4.50	

^{*}Finished sizes given. They are furnished ground to size.





		E 8074			PLATE	8075		
	For Planin Hold				For Thre	ading-Tool lders		
	Cutter, Size		Price		Cutter,	Cutter, Size		
	Rectangle Length High S	High Speed	No.	Square	Length	AlloySteel Ground to Size		
91 92 93 94	1/4 X 3/8 5/6 X 7/16 3/8 X 1/2 1/2 X 3/4	$ \begin{array}{c c} 2\frac{1}{2} \\ 3\\ 3\frac{1}{2} \\ 4\frac{1}{4} \end{array} $.35 .55 .80	50 51 52	1/4 5 16 3/8	2 3/8 2 7/8 3 3/8	.45 .55 .70	
95 96 97	5/8 x 7/8 3/4 x 1 7/8 x 1 1/8	5 6 7	1.95 3.35 5.25 8.20	turning	tool Cutters work in t see table at	he Three	ding tool	

Three feet lengths will be quoted upon as our supply permits.



WILLIAMS' "VULCAN" DROP-FORGED LATHE DOGS







PLATE 8081



PLATE 8082 SAFETY DOG



PLATE 8083

Unless otherwise specified, Dogs with Safety Screws will be supplied. Screws are not interchangeable.

Sizes up to No. 8 and 28 inclusive will be packed two in a box.

-					Scre	ws			Pr	ice		
N	0.		S	quare He	ead		Safety		G-1-1 1	D		
	1	capa-	Size			5	Size				Safety Dog	Dog with
Bent Tail	Str'g't Tail	Croj	Dia.	l'gthun- derhead	Price	Dia.	Length over all	Price	Wrench Extra	either Screw		
1	21	3/8 1/2 3/4	5 16	11/4	.08	7 16	5/8	.10	.06	.50 .55 .60 .70		
2	22	1/2	5 16 3/8 7	1 1/4	.10	7 16 9 16 5/8	13	.12	.07	. 55		
3	23	3/4	$\frac{7}{16}$	1 5/8	.12	5/8	$1\frac{1}{16}$.15	.08	. 60		
4 5	24	1	1/2	2	.15	11 16 3/4	11/4	.18	.08	.70		
5	25	11/4	1/2	21/4	.16	3/4	1 3/8	.21	.10	. 85		
6	26	11/2	9	2 3/8	.18	13 16 7/8	15/8	.25	.12	1.00		
7	27	1 3/4	5/8	2 1/2	.20	7/8	1 3/4	.30	.12	1.20		
8	28	2	11	23/4	.23	1	1 7/8	.36	.15	1.40		
9	29	21/2	11	3	.24	1 1/8	2	.43	.19	1.80		
10	30	3	3/4	31/4	.27	1 1/4	21/8	. 52	.24	2.30		
11	31	3 1/2	16 1/2 1/2 16 5/8 116 116 3/4 7/8	3 1/2	.32	$\frac{1}{1}\frac{1}{4}$ $\frac{1}{3}\frac{1}{8}$	2 1/2	. 63	.30	3.00		
12	32	5	7/8	3 3 4	.35	1 1/2	25/8	.75	.37	4.50		
13	33	5	1	4 1/2	. 50	1 5/8	31/8	. 90	.45	8.00		

With orders for Safety Dogs a "Safety" Wrench will be supplied at price stated in table.

See text on following page for further detailed description.



WILLIAMS' "VULCAN" DROP-FORGED HEAVY SERVICE LATHE DOGS









PLATE 8078 SAFETY DOG



PLATE 8079

Safety and better balance on the lathe are attained by improved design.

The screws are of special steel, hardened and tempered, and are threaded U. S. Standard except that those above 1 inch diameter have eight threads per inch. The forgings black lacquered.

The screws are not interchangeable. Please use numbers and state which Screw is desired. With orders for Safety Dogs a "Safety" Wrench will be supplied at price stated in table.

Unless otherwise specified Dogs with Safety Screws will be supplied.

N	0.				Se	erews			Price	
		capa-	Square Head			Safety			Safety	Dog
Bent Str'g't	city	5	Size	Price	5	Size	D:	Dog	with	
Tail	Tail		Dia.	Length		Dia.	Length	Price	Wrench Extra	either Screw
*112 *113 *114	*132 *133 *134	4 5 6	7/8 1 1	3 3/4 4 1/2 4 1/3	.35 .50 .50	$1\frac{1}{2}$ $1\frac{5}{8}$ $1\frac{3}{4}$	2 5/8 3 1/8 3 1/4	.75 .90 1.15	.37 .45 55	8.00 12.00

^{*}Old numbers were 12-A, 13-A and 14-A, and 32-A, 33-A and 34-A respectively.

WILLIAMS' "VULCAN" DROP-FORGED HEAVY SERVICE "C" CLAMPS



PLATE 8068

These are drop-forged from a strong, tough grade of carefully selected steel and their form is such as to utilize the metal to the greatest advantage.

They are submitted to a special refining process or "heat treatment" after forging which increases their stiffness and reduces the liability of springing.

The screws, threaded U. S. Standard, are made of a special grade of steel, well adapted to the purpose and are hardened and tempered; given lengths are under-head dimensions.

In respective order as per table the minimum capacities of Clamps are approximately as follows: $\frac{1}{3}$, $\frac{3}{3}$, $\frac{11}{16}$, $\frac{7}{3}$, $1\frac{5}{16}$, 2, $2\frac{1}{2}$, $3\frac{1}{16}$, $4\frac{1}{4}$, $6\frac{3}{8}$, $7\frac{5}{8}$.

For convenience of dealers, each Clamp up to No. 8 size, is packed in a box.

No.	Capac-	Depth of Throat	Extre Dimen of B	sions	Sc	Screw		Pr	ice
	ity	from Center of Screw	Length	Width	Dia.	Length under head	Wgt. each, Lbs.	Extra Screws each	Clamps com- plete
$0 \\ 1 \\ 1\frac{1}{2} \\ 2 \\ 3$	$ \begin{array}{c} 3/4 \\ 1 \frac{1}{4} \\ 1 \frac{3}{4} \\ 2 \frac{1}{4} \\ 3 \frac{1}{4} \end{array} $	$\begin{array}{c} & & & & & \\ & 1 & 1 & 1 & \\ & 1 & 1 & 1$	$\begin{array}{c} 2\frac{3}{16} \\ 3\frac{1}{4} \\ 4\frac{1}{4} \\ 5\frac{1}{2} \\ 7\frac{1}{4} \end{array}$	$\begin{array}{c} 1\frac{15}{16} \\ 2\frac{3}{4} \\ 3\frac{5}{8} \\ 4\frac{1}{2} \\ 5\frac{3}{4} \end{array}$	5 16 3/8 1/2 5/8 3/4	$ \begin{array}{c} 1\frac{1}{4} \\ 1\frac{3}{4} \\ 2\frac{1}{4} \\ 2\frac{7}{8} \\ 3\frac{3}{4} \end{array} $	$ \begin{array}{c} 1/4 \\ 3/4 \\ 1/2 \\ 3/8 \\ 6/2 \end{array} $.08 .11 .14 .20	.50 .75 1.25 1.75 2.50
4 5 6 8	3 1/4 4 1/2 5 1/2 6 1/2 8 1/2	$ \begin{array}{c} 2\frac{3}{4} \\ 3\frac{1}{8} \\ 3\frac{3}{8} \\ 3\frac{3}{4} \end{array} $	7 14 8 78 10 38 12 14 38	5 34 6 1/2 7 7 7/8 8 1/2	5/8 3/4 7/8 7/8 1 1 1/8	3 34 4 1/2 5 3/8 5 7/8 7	$9\frac{5}{8}$ $12\frac{1}{4}$ $16\frac{1}{2}$ 24	.38 .50 .65 .85	3.25 4.00 5.00 7.00 9.50
$ \begin{array}{c} 5 \\ 6 \\ 8 \\ 10 \frac{1}{2} \\ 12 \frac{1}{2} \end{array} $	$\frac{5\frac{1}{2}}{6\frac{1}{2}}$	3 1/8 3 3/8	$\frac{10\%}{12}$	$\begin{array}{c c} 7 \\ 7 \frac{7}{8} \\ 8 \frac{1}{2} \\ 9 \frac{1}{16} \\ 9 \frac{3}{4} \end{array}$	1	5 3/8 5 7/8 7 7 8	16	1/4 1/2	1/2 .65

Extra length screws, supplied to order, at an extra charge.



WILLIAMS' "AGRIPPA" DROP-FORGED MEDIUM SERVICE "C" CLAMPS



PLATE 8070

Drop-forged from a strong, tough grade of carefully selected steel, these light clamps are designed to afford the service formerly rendered by the heavier and bulkier steel clamps of other processes of manufacture, this form and method of production utilizing the metal to the greatest advantage. They are also submitted to a special refining process or "heattreatment" after forging which further increases their stiffness and strength and reduces the liability of springing.

The screws, threaded U. S. Standard, are made of a special grade of steel, well adapted to the purpose and are hardened and tempered. The swivels are drop-forged.

In respective order, as per table, the minimum capacities of Clamps are approximately as follows: $\frac{5}{5}$, $2\frac{5}{5}$, $4\frac{11}{16}$, $6\frac{11}{16}$, $8\frac{11}{16}$, 10, 13.

	Сара-	Depth of Throat	Extr Dim sions	en- s of	Screw			Size Handle Ap- prox.		Pri	ce
No.	city	from Center of Screw	Lgth.	Wth.	Dia.	Length with Swivel Under head	Dia.	Lgth	Wgt. each Lbs.	Screw, Handle and Swivel	Clamp
104 106 108 110 112 115 118	4 6 8 10 12 15 18	$2\frac{3}{8}$ $2\frac{1}{2}$ $2\frac{5}{8}$ $2\frac{3}{4}$ $2\frac{7}{8}$ $3\frac{1}{16}$ $3\frac{1}{4}$	$\begin{array}{c} 8\frac{3}{16} \\ 10\frac{5}{16} \\ 12\frac{7}{16} \\ 14\frac{5}{8} \\ 16\frac{13}{16} \\ 20\frac{1}{4} \\ 23\frac{1}{2} \end{array}$	$ 5\frac{1}{8} $ $ 5\frac{3}{8} $ $ 5\frac{9}{16} $ $ 5\frac{13}{16} $ $ 6\frac{1}{16} $ $ 6\frac{9}{16} $	3/4 3/4 3/4 3/4 3/4 7/8 7/8	6 6 6 6 8 1/8 8 1/8	3/8 3/8 3/8 3/8 3/8 3/8 7 16 7	7 7 7 7 7 8 8	$\begin{array}{c} 4 \frac{1}{4} \\ 5 \frac{1}{2} \\ 6 \\ 7 \frac{1}{2} \\ 9 \frac{1}{2} \\ 13 \frac{1}{2} \\ 17 \end{array}$.70 .70 .70 .70 .70 .70 1.20	2.25 2.75 3.25 3.75 4.25 5.50 7.00



WILLIAMS' "LIGHT SERVICE" DROP-FORGED "C" CLAMPS



PLATE 8069

Drop-forged from specially selected steel, submitted to a refining process or "heat-teatment" which increases their stiffness and strength and reduces the liability of springing. Their design is best adapted for use in the various wood and metal, etc., manufacturing fields which do not demand the extremes of strength and service for which the "Vulcan" and "Agrippa" Clamps provide—they are substitutes for tools less dependable, yet frequently more costly.

The Screws are made from tough, wrought steel and threaded specially for strength and rapid adjustment.

In respective order, as per table, the minimum capacities of Clamps are as follows: 0, 0, 0, $\frac{5}{8}$, 1, 2, 3, 4 inches.

No.	Сарас-	Depth of Throat	Extreme Dimensions of Body		Se	erew	Ap- prox.	Pr	ice
110.	ity	from Center of Screw	Length	Width	Dia.	Length Over All	Wgt. each, Lbs.	Screw, Handle and Swivel	Clamps com- plete
402	2 3	1 3/4	4 3/8	3 5 16	1/2	4 3/8	3/4	.30	. 75
403	3	$\frac{2}{2\sqrt{3}}$	$\frac{5\frac{9}{16}}{6\frac{15}{16}}$	$\frac{3\frac{11}{16}}{4\frac{3}{8}}$	1/2	$\frac{5}{7} \frac{7}{16}$	$\frac{1}{2}^{\frac{1}{4}}$.35	1.10
*444	4	$\frac{2}{1}\frac{7}{1}\frac{8}{2}$	63/	3 3/8	5/8	$\frac{7\frac{1}{16}}{6\frac{3}{8}}$	1 34	.40	1.10
406	6	3	$\frac{6\frac{3}{4}}{9\frac{7}{16}}$	5 14	5/8 5/8 3/4	8 3 16	3	.50	1.50
408	8	3 3/8	$11\frac{15}{16}$	5 7/8	3/4	10	4 1/2	. 60	2.00
410	10	3 3/4	$14\frac{3}{16}$	$6\frac{7}{16}$	3/4	$11\frac{1}{16}$	6	.75	2.50
412	12	4	$16\frac{7}{16}$	6 7/8	13	12 1/2	7 1/2	1.00	3.25

^{*}Special Clamp, differing only in depth of throat dimension, sectional form and style of Screw.



STEEL SOCKETS FOR TAPER SHANK TOOLS

NO. 100-ROUGH SOCKETS



PLATE 7191

Size	Holds Tools	Length Over All	Diam of Shank	Each
No.	Inches	Inches	Inches	
1 2 3 4 5 6	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$7\frac{1}{2}$ 8 10 $12\frac{1}{2}$ 16 19	1 1/8 1 1/4 1 1/2 2 2 3/4 3 8/4	1.20 1.80 2.50 4.00 7.50 14.00

NO. 102-FITTED SOCKETS



PLATE 7192

Size	1 to 2	1 to 3	1 to 4	1 to 5	2 to 3	12 to 1	19 4- 5	10 1 0	10
Has Hole No	1	1	-		2 00 0	2 10 4	2 10 8	3 to 2	3 to 3
Has Shank No.	2 00	2 50	4 20	5	3	2 4	2 5	3 2	3
Size	3 to 4	3 to 5	4 to 3	4.80	12.50	3.20	4.80	3.20	3.20
Has Hole No.	-			1 00 4	4 10 5	4 10 6	o to 4	5 to 5	5 to 6
Has Shank No.		$\frac{3}{5}$ 4.80	$\begin{array}{c} 4\\3\\4.80 \end{array}$	4 4 4.80	4 5 4.80	$\frac{4}{6}$ 12.00	5 4 12 00	5 5 12,00	5 6

Always give list number when ordering.



STEEL SOCKETS FOR TAPER SHANK TOOLS

SLEEVE OR SHEEL SOCKETS



PLATE 7906

Size No.	Inside Taper No.	Outside Taper No.	Each	Size No.	Inside Taper No.	Outside Taper No.	Each
1 to 1	1	1	1.80	2 to 5	2	5	4.40
1 to 2	1	2	1.80	3 to 3	3	3	3.00
1 to 3	1	3	2.40	3 to 4	3	4	3.00
1 to 4	1	4	3.00	3 to 5	3	5	4.40
1 to 5	1	5	4.40	4 to 4	4	4	4.40
2 to 2	2	2	2.40	4 to 5	4	5	4.40
2 to 3	2	3	2.40	4 to 6	4	6	10.00
2 to 4	2 2	4	3.00	5 to 5	5	5	10.00

CLEVELAND IMPROVED GRIP SOCKETS

A PERFECT DEVICE FOR DRIVING TAPER SHANK TOOLS



PLATE 7907

Socket	89 A ts with Shanks	No. 89 B Sockets with Fitted Shank	No. 89 B Sockets with Fitted Shanks					
Size Hole No.	Price	Size Hole	Price	Size Hole	Price			
1 2 3	4.00 5.00	No. 1, fitted to No. 2 or No. 3 No. 2, fitted to No. 3	4.50 5.50	No. 1, fitted to No. 4 No. 1, fitted to No. 5	5.25 8.50			
3 4 5	6.50 9.25 10.25	No. 3, fitted to No. 4	$7.00 \\ 10.00 \\ 14.50$	No. 2, fitted to No. 4 No. 2, fitted to No. 5 No. 3, fitted to No. 5	6.75 9.00 9.50			

When ordering tools to be used in these sockets always specify Grip Shank.



TAPER SHANK DRILLS



PLATE 7691

Diam.	Price		Length Over All	Shank	Diam.	Price		Length Over All	Shank
Inches	Carbon Steel	High Speed	Inches	Taper	Inches	Carbon Steel	High Speed	Inches	Taper
16.64,77.4.08.45.77.14.08.47.74.08.46.77.44.78.48.47.74.47.78.78.47.77.78.78.78.78.78.78.78.78.78.78.78.78	.45 .45 .45 .45 .45 .50 .50 .55 .60 .60 .65 .70	.90 .90 .90 .90 .90 .90 .90 .90 .90 .100 1.10 1.20 1.30 1.30	4 4 4 5 5 5 5 5 5 5 6 6 6 6 6 6 6 6 6 6	No. 1	전 #대(6 대) #대(6 대) #대(4 대) #대(1.80 1.80 1.90 2.00 2.00 2.10 2.10 2.20 2.20 2.40 2.60 2.60 2.80	3.00 3.25 3.25 3.50 3.50 3.75 4.00 4.40 4.40 4.75 5.15	9 1/4 9 1/4 9 1/4 9 1/2 9 1/2 9 3/4 9 7/8 9 7/8 9 7/8 10 10 10 1/4 10 1/4 10 1/2 10 5/8 10 5/8	No. 2
441234\8545227.4\16945214\2346\8545227.4\16945214\2366\8545269\86452698898898898989898989898989898989898989	.75 .75 .80 .80 .90 .90 1.00 1.10 1.10 1.20 1.30 1.30 1.40	1.40 1.40 1.50 1.65 1.65 1.75 1.75 1.90 2.00 2.00 2.15 2.15 2.25	612266344 66344 77 71444 77 71334 8 8 1444	No. 1	594356432554 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	$ 3.00 \\ 3.00 \\ 3.25 \\ 3.25 \\ 3.50 \\ 3.75 \\ 4.00 \\ 4.25 \\ 4.50 \\ 4.50 \\ 4.75 \\ 4.75 $	5.50 5.90 5.90 6.25 6.25 7.25 7.25 7.75 8.25 8.90 8.90	10 34 10 34 10 78 10 78 11 11 11 1/8 11 1/8 11 1/8 11 1/8 11 1/8 11 1/8 11 1/8 11 1/8 11 1/8	}No. 3
37 64 19 32 39 64 5 8 4 1 21 2 3 2	1.50 1.50 1.60 1.60 1.70 1.70	2.40 2.40 2.50 2.50 2.75 2.75	8 ½ 8 ½ 8 ¾ 8 ¾ 8 ¾ 9 9	No 2	$ \begin{array}{c} 1 \frac{34}{64} \\ 1 \frac{3}{36} \\ 1 \frac{64}{64} \\ 1 \frac{7}{32} \\ 1 \frac{15}{64} \\ 1 \frac{1}{4} \end{array} $	5.00 5.00 5.25 5.25 5.50 5.50	9.50 9.50 10.15 10.15 10.75 10.75	12 12 12 12 18 12 18 12 12 12 12 12 12 12 12 12 12 12 12 12	

(Continued on following page.)



TAPER SHANK DRILLS-CONTINUED

	Price	Each	T		1	Price	Each	T	
Diam. Inches	Carbon Steel	High Speed	Length Over All Inches	Shank Taper	Diam. Inches	Carbon Steel	High Speed	Length Over All Inches	Shank Taper
$\begin{array}{c} 1\frac{17}{64} \\ 1\frac{9}{32} \\ 1\frac{19}{64} \\ 1\frac{5}{16} \\ 1\frac{21}{64} \\ 1\frac{11}{32} \\ 1\frac{23}{64} \\ 1\frac{3}{8} \end{array}$	5.75 5.75 6.00 6.00 6.25 6.25 6.50 6.50	11.50 11.50 12.25 12.25 13.00 13.75 13.75	14 ½8 14 ½8 14 ¼ 14 ¼ 14 ¼ 14 ¾ 14 ¾ 14 ¾ 14 ½ 14 ½		$\begin{array}{c} 1\frac{29}{332} \\ 1\frac{59}{64} \\ 1\frac{16}{16} \\ 1\frac{64}{332} \\ 1\frac{1}{5} \\ 2 \end{array}$	16.25 17.00 17.00 17.75 17.75 18.50 18.50	31.25 32.50 32.50 33.75 33.75 35.00 35.00	16 ½ 16 ½ 16 ½ 16 ½ 16 ½ 16 ½ 16 ½ 16 ½	\\\\ \\\ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	7.00 7.50 7.50 8.00 8.00 8.50 9.00 9.50 9.50 10.00 10.50 11.00 11.50 12.00 12.50 12.50 12.50 12.50 12.50 14.00 14.75 14.75 15.50 15.50 16.25	$\begin{array}{c} 14.65\\ 14.65\\ 14.65\\ 15.50\\ 15.50\\ 16.40\\ 16.40\\ 17.25\\ 18.15\\ 19.00\\ 20.00\\ 20.00\\ 20.00\\ 21.00\\ 22.00\\ 21.00\\ 22.00\\ 22.00\\ 23.00\\ 24.00\\ 22.00\\ 22.00\\ 22.00\\ 22.00\\ 22.00\\ 23.00\\ 22.00\\ 22.00\\ 22.00\\ 22.00\\ 22.00\\ 22.00\\ 23.00\\ 22.00\\ 22.00\\ 23.00\\ 22.00\\ 22.00\\ 23.00\\ 22.00\\ 23.00\\ 24.00\\ 25.00\\ 25.00\\ 25.00\\ 25.00\\ 30.00\\ 30.00\\ 30.00\\ 30.00\\ 30.00\\ 30.00\\ 31.25\\ \end{array}$	1 1 4 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	No. 4	14-12-14-16-54-18-18-18-18-18-18-18-18-18-18-18-18-18-	19.25 19.25 20.00 20.75 20.75 20.75 21.50 21.50 22.25 22.25 23.00 23.75 24.50 24.50 24.50 26.75 26.00 26.75 27.50 28.25 27.50 28.25 29.00 26.75 27.50 28.25 29.00 28.25 29.00 28.25 29.00 28.25 29.00 28.25 29.00 28.25 29.00 29.00 29.00 29.00 29.00 29.00 29.75	36 .25 36 .25 37 .50 38 .75 38 .75 40 .00 41 .25 41 .25 42 .50 42 .50 43 .75 45 .00 47 .50 50 .00 50 .00 50 .52 .50 55 .00 57 .50 60 .00 62 .50 62 .50 62 .50 65 .00 66 .00	16 1/2 16 1/2 17 17 17 17 17 17 17 17 17 17 17 17 17	No. 5



TAPER SHANK DRILLS, SHANKS LARGER THAN REGULAR



PLATE 7908

Diam- eter Inches	Carbon Steel Each	High Speed Each	Length Over All Inches	Shank Taper	Diam- eter Inches	Carbon Steel Each	High Speed Each	Length Over All Inches	Shank Taper
5 16	1.40	2.80	6 1/2		7/8	3.20	5.60	10 ½	1
$\tfrac{1}{3} \tfrac{1}{2}$	1.40	2.80	6 3/4		29 32	3.30	5.75	10 5/8	No. 3
3/8	1.40	2.80	7						
$\frac{1}{3}\frac{3}{2}$	1.40	2.80	7 1/4		1 1/8	5.40	10.50	12 1/8	
716	1.40	2.80	7 1/2	No. 2	$1\frac{5}{32}$	5.60	10.80	$12\frac{1}{4}$	
15 32	1.45	3.00	7 3/4		$1\frac{3}{16}$	5.80	11.10	$12\frac{1}{2}$	No. 4
1/2	1.50	3.00	8		$1\frac{7}{32}$	6.00	11.55	12 3/4	
$\frac{17}{32}$	1.60	3.20	81/4		1 1/4	6.20	12.00	13	}
9 16	1.70	3.20	8 1/2	j	1 3/4	13.25	25.00	16 ½)
1 9 3 2	2.50	4.60	93/8)	$1\frac{25}{32}$	14.00	26.25	16 1/2	
5/8	2.50	4.60	9 1/2		1 13	14.75	27.50	16 1/2	
$\frac{21}{32}$	2.50	4.60	9 5/8		1 27 32	15.50	28.75	16 1/2	
11	2.60	4.60	9 3/4		1 1/8	16.25	30.00	16 ½	No. 5
$\frac{23}{32}$	2.70	5.00	9 7/8	No. 3	$1\frac{29}{32}$	17.00	31.25	161/2	
3/4	2.80	5.00	10		1 15	17.75	32.50	161/2	
$\tfrac{25}{32}$	2.90	5.00	10 1/8		$1\frac{31}{32}$	18.50	33.75	161/2	
13 16	3.00	5.45	101/4		2	19.25	35.00	161/2	
2 7 3 2	3.10	5.45	103/8						

64th sizes furnished at price of next larger size.

STRAIGHT SHANK DRILLS, LONG SET



PLATE 7909

Diam- eter Inches	Carbon Steel Each	High Speed Each	Length Over All Inches	Diam- eter Inches	Carbon Steel Each	High Speed Each	Length Over All Inches
12	.45	. 90	3 5/8	41	1.70	2.75	9
5	.45	.90	4	21	1.70	2.75	9
3	.45	.90	4 3/8	43	1.80	3.00	9 1/4
3.2	.45	.90	4 34	21 32 43 64 11 16	1.80	3.00	91/4
1/0	.45	.90	51/8		1.90	3.25	$ 9\frac{1}{2} $ $ 9\frac{1}{2} $ $ 9\frac{1}{2} $ $ 9\frac{3}{4} $
98	.45	.90	5 3/8	23	1.90	3.25	91/2
6.4	.45	.90	5 3/8	47	2.00	3.50	934
32	. 50	.90	534	3/4	2.00	3.50	93/
6.4	. 50	.90	537	49	2.10	3.75	9 3 4 9 7 8
16	. 55	1.00	5 3 4 5 7 8	25	2.10	3.75	9 7/8
6.4	.55	1.00	5 7/8	3 2 5 1	2.20	4.00	10
3 2	.60	1.10	618	13	2.20	4.00	10
64	. 60	1.10	618	16	2.40	4.40	10 1/4
17	. 65	1.20	61/4	64	2.40	4.40	10 14
64	.65	1.20	6 1/4	3 2 5 5	2.60	4.75	$10\frac{1}{2}$
32	.70	1.30	638	64	2.60	4.75	10 1/2
64	.70	1.30	63/8	57	2.80	5.15	105%
16	.75	1.40	6 1/8	4.00 (3.7.4) (4.0.4) (2.1.4) (3.7.4	2.80	5.15	$10\frac{5}{8}$ $10\frac{5}{8}$
64	.75	1.40	$\frac{6\frac{1}{2}}{6\frac{1}{2}}$	32	3.00	5.50	10 34
32	.80	1.40	6 3/4	64	3.00	5.50	103
64	.80	1.50	6 3/4	16	3.25	5.90	$\begin{array}{c} 10\overset{3}{3}\overset{4}{4} \\ 10\overset{7}{7}\overset{8}{8} \\ 10\overset{7}{7}\overset{8}{8} \end{array}$
28	.90	1.65	7	64	3.25	5.90	10 7%
64	.90	1.65	7	3 2 6 3	3.50	6.25	11
32	1.00	1.75	71/4	1 64	3.50	6.25	11
6.4	1.00	1.75	7 1/4	1 1	3.75	6.75	111/
16	1.10	1.75	714	$\frac{1}{64}$	3.75	6.75	$11\frac{1}{8}$ $11\frac{1}{8}$
16	1.10	1.90	$7\frac{1}{2}$ $7\frac{1}{2}$ $7\frac{1}{2}$ $7\frac{3}{4}$ $7\frac{3}{4}$	$1{\frac{3}{32}}^{\frac{1}{32}}$ $1_{\frac{3}{64}}^{\frac{3}{64}}$	4.00	7.25	1112
3 2	1.20	2.00	737	$1\frac{64}{1\frac{1}{16}}$	4.00	7.25	11 ½ 11 ¼
64	1.20	2.00	734	$\begin{array}{c} 1\frac{1}{16} \\ 1\frac{5}{64} \end{array}$	4.25	7.75	11 10
33	1.30	2.15	1 %	$1\frac{64}{1\frac{3}{12}}$	4.25	7.75	1116
64	1.30	2.15	8 8	$1\frac{3}{32}$ $1\frac{7}{64}$	4.50	8.25	11 3/
3 2	1.40	$\frac{2.15}{2.25}$	0 1/	1 1/8	4.50	8.25	11 3
1/2 33/4 647 325/64 9 1667 132	1.40	2.25	8 ½ 8 ½ 8 ½	$\frac{1}{1}\frac{1}{8}$ $\frac{9}{64}$	4.75	8.90	11 ½ 11 ½ 11 ½ 11 ¾ 11 ¾ 11 ¼ 11 ¼ 11 ¼
16	1.40	2.25	91/	1 64	4.75	8.90	11 78
64	1.50	$\frac{2.40}{2.40}$	8 1/2 8 1/2	$1\frac{5}{32}$ $1\frac{11}{64}$	5.00	9.50	12
3 2	1.60	2.40	0 1/2	1 64	5.00	9.50	12
64	1.60	2.50	8 3 4 8 3 4	$1\frac{3}{16}$ $1\frac{13}{64}$	5.25	10.15	12 1/8

(Continued on following page.)

STRAIGHT SHANK DRILLS, LONG SET

(CONTINUED)

	.50 30.00 161/2
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$



STRAIGHT SHANK DRILLS, SHORT SET



PLATE 7910

Diameter	Price pe	r Dozen	Length Over Al
Inches	Carbon Steel	High Speed	Inches
1,	1.50		116
33,	1.55		$\begin{array}{c} 1 & 1 & 2 \\ 1 & 3 & 4 \end{array}$
1	1.60	5.70	91%
5	1.65	5.70	9 5%
3	1.65 1.70	5.70	5 3 2
7	1.75	5.90	2 7
1 2	1.80	5.90	2 8
98	1.85	6.10	2.14
72 - 73 - 15 - 15 - 15 - 15 - 15 - 15 - 15 - 1	1.90	6.10	2 15 2 4 5 2 2 2 2 2 2 2 3 3 3 3 3 5 5 8 7 4 5 8 2 3 3 3 3 5 5 8 7 4 5 8 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3
3 2	2.00	6.30	9 34
6 £	2.00	6.30	3 78
16	2.25 2.50 2.75	6.30 7.00	3 2
	2.00	7.00	. 9 3
3 2 1 5 6 4	2.73	7.00	3 74
61	3.00	7.35 7.35	3 /8
14	3.25	6.35	4
74. 6.0 7.0 7.0 16.4 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6	3.00 3.25 3.50 3.80 4.00	9.10	4 1 8
3 2	3.80	9.10	4 14
6.4	4.00	10.50	4 3/8
16	4.35 4.70	10.50	4 1/2 4 5/8
61	4.70	12 00	4 %
	5.05 5.50	12.00	4 34
67	5.50	13.50	4 5 2 4 5 8 4 3 4 4 7 8
3/8	6.00 6.50	13.50	5
64	6.50	15,00	518
3 2	7.00 7.75	15.00	5 1/4
27	7.75	17.00	5 3/8
7 16	8.50	17.00	5 1/2
29	9.25	18.75	558
1 5 3 2	10.00	18.75	5 3 4
THE AVERAGE AND A STATE OF THE AVERAGE AND A STA	11.00	20.00	4.55.55.55.55.55.55.55.55.55.55.55.55.55
1/2	12.00	20.00	6

Sizes $\frac{1}{16}$ to $\frac{5}{6}$ inch inclusive, packed one dozen to envelope; $\frac{21}{64}$ to $\frac{1}{2}$ inch inclusive, half dozen in envelope. Broken packages 20% extra,

STRAIGHT SHANK DRILLS, LETTER SIZE



PLATE 7911

Diameter	Carbon Steel Per Doz.	High Speed Per Doz.	Decimal Diam. Inches	Length Over All, Inches
A	3.00	7.35	.234	3 13
B C	3.05	7.35	.238	$3\frac{13}{16}$ $3\frac{13}{16}$
C	3.10	7.35	.242	$3\frac{13}{16}$ $3\frac{13}{16}$
D E F G H I J	3.15	7.35	.246	3 13
E	3.25	7.35	.250	9 13
F	3.35	9.10	.257	41/
G	3.45	9.10	.261	4 /4
H	3.55	9.10	.266	11/
I	3.65	9.10	.272	$\frac{4}{4}\frac{1}{4}$
J	3.70	9.10	.277	11/
K	3.80	9.10	.281	4 1/4
K L	3.90	10.50	.290	11/
	4.00	10.50	.295	4 1/4 4 1/4
M NOPQ RSTUV	4.25	10.50	.302	11/
0	4.40	10.50	.316	11/
P	4.60	12.00	.323	15%
Q	4.75	12.00	.332	13/
Ř	5.00	12.00	.339	13/
S	5.15	13.50	.348	17%
T	5.30	13.50	.358	4 78 4 78
U	5.50	13.50	.368	4 7/8 5 5
V	6.00	13.50	.377	5
W	6.50	15.00	.386	514
X	6.75	15.00	.397	518
W X Y Z	7.00	15.00	.404	$ 5\frac{1}{8} $ $ 5\frac{1}{4} $ $ 5\frac{1}{4} $ $ 5\frac{3}{8} $
Z	7.25	17.00	.413	5 3 4

Sizes A to N inclusive packed one dozen to envelope; sizes O to Z inclusive one-half dozen to envelope. Broken packages $20\,\%$ extra.



STRAIGHT SHANK DRILLS, WIRE GAUGE



PLATE 7912

Wire Gauge No.		High Speed Per Doz.	Decimal Diam. Inches	Length Over All Inches	Wire Gauge No.		High Speed Per Doz.	Decimal Diam. Inches	Length Over All Inches
1	2.75	7.00	.2280	4	31	1.75	5.90	.1200	234
2	2.75	7.00	.2210	3 15	32	1.75	5.90	.1160	$2\frac{3}{4}$ $2\frac{11}{16}$
3	2.75	7.00	.2130	$\frac{3\frac{15}{16}}{3\frac{15}{16}}$	33	1.75	5.90	.1130	$2\frac{11}{16}$
4 5	2.75	7.00	.2090	3 7/8	34	1.75	5.90	.1110	25%
5	2.75	7.00	.2055	3 13	35	1.75	5.90	.1100	2 9
6	2.50	7.00	.2040	$3\frac{13}{16}$	36	1.75	5.90	.1065	2 9
7	2.50	7.00	.2010	3 3/4	37	1.75	5.90	.1040	21/2
8	2.50	7.00	.1990	3 11	38	1.75	5.90	.1015	27
9	2.50	7.00	.1960	3 11	39	1.75	5.90	.0995	2 7
10	2.50	7.00	.1935	35/8	40	1.75	5.90	.0980	23/8
11	2.25	6.30	.1910	3 9 16	41	1.70	5.70	.0960	2 5
12	2.25	6.30	.1890	$ \begin{array}{r} 3 \frac{5}{8} \\ 3 \frac{9}{16} \\ 3 \frac{9}{16} \end{array} $	42	1.70	5.70	.0935	$\begin{array}{c} 2\frac{5}{8} \\ 2\frac{16}{16} \\ 2\frac{1}{16} \\ 2\frac{1}{16} \\ 2\frac{1}{16} \\ 2\frac{5}{16} \\ 2\frac{5}{16} \\ 2\frac{5}{16} \end{array}$
13	2.25	6 30	.1850	$ \begin{array}{c} 3\frac{1}{2} \\ 3\frac{7}{16} \\ 3\frac{7}{16} \end{array} $	43	1.70	5.70	.0890	21/4
14	2.25	6.30	.1820	3 7/16	44	1.70	5.70	.0860	$\begin{array}{c} 2\frac{3}{16} \\ 2\frac{3}{16} \\ 2\frac{1}{8} \\ 2\frac{1}{16} \\ 2\frac{1}{16} \\ 2\frac{1}{16} \\ 2\end{array}$
15	2.25	6.30	.1800	$3\frac{7}{16}$	45	1.70	5.70	.0820	$2\frac{3}{16}$
16	2.00	6.30	.1770	$\frac{3\frac{3}{8}}{3\frac{5}{16}}$	46	1.65	5.70	.0810	$\frac{2\frac{1}{8}}{2\frac{1}{16}}$
17	2.00	6.30	.1730	3 5 16	47	1.65	5.70	.0785	2 16
18	2.00	6.30	.1695	3 5	48	1.65	5.70	.0760	$2\frac{1}{16}$
19	2.00	6.30	.1660	3 1/4	49	1.65	5.70	.0730	2
20	2.00	6.30	.1610	3 3 16	50	1.65	5.70	.0700	1 15
21	1.90	6.10	.1590	$3\frac{\frac{3}{16}}{3\frac{3}{16}}$	51	1.60	5.70	.0670	1 15
22	1.90	6.10	.1570	3 1/8	52	1.60	5.70	.0635	1 7/8
23	1.90	6.10	.1540	3 1 16	53	1.60	5.70	.0595	1 13
24	1.90	6.10	.1520	3 16	54	1.60	5.70	.0550	1 13
25	1.90	6.10	.1495	3	55	1.60	5.70	.0520	1 3/4
26	1.80	6.10	.1470	2 15	56	1.55	5.70	.0465	1 11
27	1.80	6.10	.1440	$\frac{2}{16}$ $\frac{15}{16}$ $\frac{15}{2}$ $\frac{7}{8}$	57	1.55	5.70	.0430	1 11
28	1.80	6.10	.1405	2 7/8	58	1.55	5.70	.0420	1 5/8
29	1.80	6.10	.1360	$2\frac{13}{16}$	59	1.55	5.70	.0410	$1\frac{9}{16}$
30	1 80	6.10	.1285	2 13	60	1.55	5.70	.0400	$1\frac{1}{16}$

Wire Gauge No.	Price per Dozen	Decimal Diameter Inches	Length Over All Inches	Wire Gauge No.	Price per Dozen	Decimal Diameter Inches	Length Over All Inches
61	1.50	.0390	1 1/2	71	1.50	.0260	1 5
62	1.50	.0380	1 1/2	72	1.50	.0250	1 1/4
63	1.50	.0370	1 1/2	73	1.50	.0240	$1\frac{3}{16}$
64	1.50	.0360	1 1/2	74	1.50	.0225	1 1/8
65	1.50	.0350	1 1/2	75	1.50	.0210	1 16
66	1.50	.0330	1 1/2	76	1.50	.0200	1
67	1.50	.0320	1 7 16	77	1.50	.0180	1.5
68	1.50	.0310	$1\frac{7}{16}$	78	1.50	.0160	7%
69	1.50	.02925	1 3/8	79	1.50	.0145	13
70	1.50	.0280	1 5	80	1.50	.0135	13 16 3/4

Nos. 1 to 80 inclusive, packed one dozen to envelope; broken packages 20% extra.

SQUARE SHANK RATCHET DRILLS



PLATE 7747

121	Price	Each	Length	Diam-	Price	Each	Length Over
Diam- eter Inches	Carbon Steel	High Speed	Over All Inches	eter Inches	Carbon Steel	High Speed	All Inches
	.90 .95 .95 1.00 1.05 1.15 1.20 1.25 1.30 1.35 1.30 1.35 1.40 1.45 1.45 1.50 1.50 1.50 1.50 1.50 1.50 1.50 1.5	2.30 2.35 2.40 2.45 2.50 2.55 2.65 2.70 2.85 2.85 2.90 2.85 2.90 3.10 3.20 3.30 3.40 3.50 3.65 3.65 3.80 4.20 4.70 5.00 4.70 5.00	4 4 1 5 5 5 5 5 5 6 6 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2.40 2.55 2.70 2.85 3.00 3.10 3.25 3.35 3.50 3.65 3.75 4.20 4.35 4.50 4.65 4.80 5.75 6.10 6.50 6.90 7.75	5.25 5.50 5.75 6.00 6.30 6.70 7.00 7.30 7.60 8.25 8.60 9.40 9.40 10.20 11.00 12.50 14.00 15.50 17.00 18.50 20.50 22.50 25.00	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8

No. 1 Shanks— $\frac{3}{2}$ 8 inch by $\frac{5}{2}$ 8 inch by $1\frac{1}{2}$ 2 inches long. No. 2 Shanks— $\frac{1}{2}$ 4 inch by $\frac{3}{2}$ 4 inch by $\frac{1}{2}$ 4 inches long.

Unless otherwise specified No. 1 Shank will be furnished, except on High Speed Drills over 1 inch, which will be equipped with No. 2 Shank,



DRILLS FOR BLACKSMITHS' DRILL PRESSES

1/2-INCH SHANK, LONG SET



PLATE 7913

Shanks ½ inch Diameter and 2½ inches long.

Diam. Inches	Carbon Steel Each	High Speed Each	Length Over All Inches	Diam. Inches	Carbon Steel Each	High Speed Each	Length Over Al Inches
	.45 .45 .50 .55 .60 .65 .70 .75 .80 .90 1.00 1.20 1.30 1.40 1.50 1.60 1.70 1.80 1.90 2.00 2.10 2.20	1.10 1.20 1.30 1.40 1.50 1.65 1.75 1.90 2.15 2.25 2.25 2.75 3.00 3.25 3.50 3.75 4.00	55555448554 66133134 77734 7778 88888 99134 99378	217 2 18 22 11 16 11 12 12 13 13 14 15 12 13 14 15 12 14 15 12 15 15 15 15 15 15 15 15 15 15 15 15 15	2.40 2.60 2.80 3.00 3.25 3.75 4.00 4.25 4.50 5.25 6.00 5.25 6.50 7.00 7.50 8.50	4.40 4.75 5.15 5.50 5.90 6.25 6.75 7.25 8.25 8.90 9.50 10.15 11.50 12.25 13.75 14.65 15.50 16.40 17.25	10 4 10 10 10 10 10 10 1

High Speed Drills with $\frac{1}{2}$ inch shanks will be furnished in sizes over $\frac{3}{4}$ inch diameter only at customer's risk, as we do not consider the shanks strong enough.

Unless otherwise specified these drills will always be furnished with flatted shanks.

DRILLS FOR BLACKSMITHS' DRILL PRESSES

5%-INCH SHANK (.648 inch Exact Diameter)



PLATE 7914

Shanks are $2\frac{1}{4}$ inches long and .648 inch exact diameter—commonly called $\frac{5}{8}$ inch.

Diam. Inches	Carbon Steel Each	High Speed Each	Length Over All Inches	Diam. Inches	Carbon Steel Each	High Speed Each	Length Over Al Inches
1/0	. 50	0.000	4 7/8	2 7 3 2	2.00	3.15	6
5	. 55	K. 40000	4 7/8	1/8	2.10	3.30	6
32	. 60	2012/02/02	5 5/8	29	2.20	3.50	6
7	. 65	9 40904	4 78 5 58 5 58 6	29 32 15 16	2.30	3.70	6
1/4	.70	1.20	6	31 32	2.40	3.90	6
9	.75	1.30	6	1	2.50	4.10	6
5	.80	1.40	6	$1\frac{1}{32}$	2.60	4.30	6
11	.85	1.50	6	1 16	2.70	4.50	6
3/0	.90	1.55	6	$1\frac{3}{32}$	2.80	4.75	6
13	.95	1.65	6	11/8	2.90	5.00	6
7	1.00	1.70	6	1 5	3.00	5.25	6
15	1.05	1.80	6	1 3	3.10	5.50	6
12	1.10	1.85	6	$\begin{array}{c} 1\frac{3}{16}\\1\frac{7}{32}\end{array}$	3.20	5.80	6
17	1.15	1.95	6		3.30	6.10	6
9	1.20	2.05	6	$1\frac{1}{4}$ $1\frac{9}{32}$	3.45	6.40	6
16	1.25	2.20	6	$1\frac{5}{16}$	3.60	6.70	6
5%	1.30	2.30	6	$1\frac{11}{32}$	3.75	7.00	6
21	1.40	2.40	6	1 3/8	3.90	7.40	6
11	1.50	2.50	6	$1\frac{13}{32}$	4.05	7.80	6
23	1.60	2.65	6	$1\frac{7}{16}$	4.20	8.20	6
	1.70	2.75	6	1 15	4.35	8.60	666666666666666666666666666666666666666
25	1.80	2.90	6	1 12	4.50	9.00	6
13	1.90	3.00	6	2.5			

High Speed Drills with $\frac{5}{8}$ inch shank will be furnished in sizes over $\frac{3}{4}$ inch diamater only at customer's risk, as we do not consider the shanks strong enough.

Unless otherwise specified these drills will always be furnished with flated shanks.



DRILLS FOR BLACKSMITHS' DRILL PRESSES



PLATE 7746

Shanks 1/2 inch diameter and 2 1/4 inches long.

D.	Pric	e Each	Length	TNIons	Price	Each	Length
Diam- eter Inches	Carbon Steel	High Speed	Over All Inches	Diam- eter Inches	Carbon Steel	High Speed	All Inches
1/6	.45		4.78	2 7 3 2 7 8	2.00	3.15	6
5	.45	1000000 to 1000000	4 7/8	72	2.10	3.30	6
3 2	. 50	0 0000 0 0 0000 0	$\frac{4}{5}\frac{7}{5}\frac{8}{8}$ $\frac{5}{5}\frac{5}{8}$	2 9 3 2 1 5	2.20	3.50	6
16	.55	100000000000000000000000000000000000000	5 5/8	15	2.30	3.70	6
32	. 60	1.10	6	16 31 32	2.40	3.90	6
9	. 65	1.20	6	1 32	2.50	4.10	6
3 2	.70	1.30	6	1 1 1 2	2.60	4.30	6
16	.75	1.40	6 6 6 6	1 1	2.70	4.50	6
3 2	.80	1.45	6	$1\frac{1}{16}$ $1\frac{3}{32}$	2.80	4.75	6
13	.85	1.55	6	1 1/2	2.90	5.00	6
3 2	.90	1.60	6	1 5	3.00	5.25	6
16 15	.95	1.70	6	$\begin{array}{c} 1 \frac{1}{3} \\ 1 \frac{5}{32} \\ 1 \frac{3}{16} \end{array}$	3.10	5.50	6
3 2	1.00	1.75	6	$1\frac{7}{22}$	3.20	5.80	6
17	1.05	1.90	6	11/4	3.30	6.10	6
3 2	1.10	2.05	6	$\begin{array}{c} 1\frac{7}{32} \\ 1\frac{1}{4} \\ 1\frac{9}{32} \\ 1\frac{5}{16} \\ 1\frac{1}{312} \end{array}$	3.45	6.40	6
16	1.20	2.20	6	1 5	3.60	6.70	6
3 2	1.30	2.30	6	1 11	3.75	7.00	6
1/2 6 17 9 18 18 18 18 18 18 18 18 18 18 18 18 18	1.40	2.40	6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	1 3/8	3.90	7.40	666666666666666666666666666666666666666
32	1.50	2.50	6	1 13	4.05	7.80	6
16	1.60	2.65	6	$1\frac{13}{32}$ $1\frac{7}{16}$	4.20	8.20	6
32	1.70	2.75	6	1 15	4.35	8.60	6
25	1.80	2.90	6	1 1/2	4.50	9.00	6
13	1 90	3.00	6	- / 2			

High Speed Drills with ½ inch shanks will be furnished in sizes over ¾ inch diameter only at customer's risk, as we do not consider the shanks strong enough.

BIT STOCK DRILLS

FOR METAL OR WOOD



PLATE 7915

Diameter Inches	Price Per Dozen	Whole Length Inches	Diameter Inches	Price Per Dozen	Whole Length Inches
	2 . 50 2 . 60 2 . 70 2 . 85 3 . 00 3 . 25 3 . 50 4 . 00 4 . 25 4 . 50 5 . 50 6 . 00 6 . 50 7 . 00 7 . 50 8 . 50 9 . 25 10 . 50	3 3 3 3 3 3 4 4 4 4 4 10 5 10 10 10 10 10 10 10 10 10 10 10 10 10	1522 - 1523 - 1525 - 15	11,75 13,00 14,25 15,50 16,75 18,00 19,50 21,00 22,50 24,00 25,50 27,00 28,50 30,00 31,50 33,00 34,50 36,00 39,00 42,00 45,00 45,00	

Sizes $\frac{1}{16}$ to $\frac{3}{8}$ inch inclusive, packed one dozen to a box. Broken packages $20\,\%$ extra.

CENTER DRILLS



PLATE 7916

Diameter Inches	Price per Dozen	Length Over All Inches	Diameter Inches	Price per Dozen	Length Over All Inches
16 54 33 32 7 64 1/8 9 64 65	1.60 1.65 1.70 1.75 1.80 1.85	1 1 1 1/4 1 1/4 1 1/4 1 1/4	11 64 3 116 163 64 7 32 164 11/4	2.00 2.25 2.50 2.75 3.00 3.25 3.50	1 ½ 1 ½ 1 ½ 1 ½ 1 ½ 1 ½ 1 ½

CENTER DRILLS, WIRE GAUGE



PLATE 7917

Wire Gauge Size No.	Price per Dozen	Decimal Diameter Inches	Length Over All Inches
30	1.80	.1285	11/
40	1.75	.0980	1 1/4
45	1.70	.0820	1 1/4
50	1.65	.0700	11/
55	1.60	.0520	11/

BIT STOCK COUNTERSINKS



PLATE 7918

Diameter Inches	Each	Length Over All Inches	Diameter Inches	Each	Length Over All Inches
3/8 1/2 5/8	. 50 . 60 . 75	4 ¹ / ₄ 4 ¹ / ₄ 4 ¹ / ₄	3/4 7/8	.90 1.05 1.20	5 5 5

The included angle at point is 82 degrees. Special angles to order. Always give list number when ordering.



DRILL AND COUNTERSINK COMBINED



PLATE 7199

Included angle, 60°. Other angles made to order at special prices.

Size Number	Diameter of Drill	Approx. Fractional Equiva- lents	Price Per Dozen	Diameter of Body Inches	Decimal Equivalents
1	No. 57 x No. 57	3 64	2.00	1/8	.043 x .043
2 3	No. 55 x No. 55		2.25	13	.052 x .052
3	No. 52 x No. 52	1 16	2.25	13	.063 x .063
4	No. 49 x No. 49	1.0	2.50	15	.073 x .073
5	No. 49 x No. 45	1	2.50	15	.073 x .082
5	No. 46 x No. 46	5 64	2.50	15	.081 x .081
1	No. 42 x No. 42	5 64 3 3 2	2.75	3	.093 x .093
8	No. 42 x No. 30	3 X 1/8	2.75	3	.093 x .128
	No. 30 x No. 30		2.75	3	.128 x .128
10	No. 22 x No. 22	5 3 2	3.50	77	.157 x .157
11	No. 13 x No. 13	1 8 5 3 2 3 1 6	3.50	7 16	.185 x .185
12	3 X 3 64		2.25	5 3 2	.046 x .046
14	$\frac{1}{15}$ x No. 45		2.25	1/X 51 44 51 45 51 4 51 51 4 51 51 51 4 51 51 51 51 51 51 51 51 51 51 51 51 51	.062 x .082
15	$\frac{3}{1.6} \times \frac{5}{3.2}$		3.50	7 16	.187 x .156

DRILL AND COUNTERSINK COMBINED

FITTING BLACKSMITHS' DRILL PRESSES



PLATE 7200

Included Angle, 60°

Size Number	Diameter of Drill Inches	Price Per Dozen	Diameter of Body Inches
1	$\frac{7}{32} \times \frac{7}{32}$	4.60	1/2
2	32 X 32	4.60	1/2
3	32 X 32 11 w 11	$\frac{4.60}{5.00}$	1/2
5	32 A 32 11 x 13	5.00	12
6	13 X 13 13	5.00	1/6
7	$\frac{7}{32}$ X $\frac{7}{32}$	7.25	5/8
8	$\frac{7}{32} \times \frac{9}{32}$	7.25	5/8
10	32 X 32 11 w 11	7.25	5/8
11	11 X 13	7.75 7.75	9 8 5 2
12	13 X 13 32	7.75	5%

Other angles made to order at special prices.

DRILLS IN SETS



PLATE 7919

	PLATE 79	19	
	}	Price p	er Set
No.		Mounted on Stand	Not Mounted
1	Taper shank drills ¼ to 1 inch by 16ths		22.40
$\frac{1}{2}$	Taper shank drills $\frac{3}{8}$ to $\frac{1}{4}$ inch by 16ths Taper shank drills $\frac{3}{8}$ to $\frac{3}{4}$ inch by 32nds and $\frac{13}{16}$ to $1\frac{1}{4}$ inch		40.10
5	by 16ths. Short set straight shank drills $\frac{1}{16}$ to $\frac{1}{2}$ inch by 64ths, mount-	• • • • •	48.50
	ed on maple blocks. Short set straight shank drills $\frac{1}{16}$ to $\frac{1}{2}$ inch by 32nds, mount-	13.50	11.50
6	Short set straight shank drills $\frac{1}{16}$ to $\frac{1}{2}$ inch by 32nds, mounted on maple blocks	8.00	6.00
7	ed on maple blocks. Wire Gauge drills No. 1 to No. 60, short set straight shank	14.50	
0	drills 14 to 3/8 inch by 32nds, mounted on maple blocks	14.50	11.60
8	Wire gauge drills No. 1 to No. 60, mounted on maple blocks	12.50	9.70
9	Wire gauge drills alternate Nos. 1 to 59, on maple blocks Jewelers' set of 36 drills, No. 30 (1/8 inch) to No. 65, wire	7.00	4.90
	gauge in mahogany case with cap	8.00	5.00
11	Straight shank drills, letter size A to Z, on maple blocks	12.00	9.80
13	Bit stock drills, $\frac{1}{16}$ to $\frac{1}{4}$ inch by 32nds	4.25	
13A	Wood bits for brace, $\frac{1}{16}$ to $\frac{1}{4}$ inch by 32ds. $\frac{5}{16}$ to $\frac{3}{8}$ inch by 16ths in screw-top wooden boxes.	4.00	14 mm x e
13B	Wood bits for brace, ½ to ¼ inch by 32ds	3.70	
101	5 to 3/8 inch by 16ths in corduroy silk cases	0.10	
14B	Bit stock drills, ½ to ¼ inch by 32ds. 56 to 3% inch by 16ths in leatherette cases.	4.35	
18	Short set straight shank drills \(\frac{1}{16}\) to \(\frac{3}{16}\) by 64ths, contained		
50	in convenient pocket size package	1.60	
60	ed on metal stands Short set straight shank drills 1 m/m to 6.5 m/m by.1 m/m	15.00	11.50
00	on metal stands	13.50	9.90
80	Wire gauge drille No. 1 to No. 60 mounted as a stall stands		9.70
ov	Wire gauge drills No. 1 to No. 60, mounted on metal stands	13.25	
	Set of drills for case $43\frac{1}{2}$ A, $\frac{3}{16}$ to $\frac{37}{2}$ inch by 32ds. List No. 120 Set of drills for case $43\frac{1}{2}$ B, $\frac{5}{52}$ to $\frac{37}{2}$ inch by 32ds only. List	* * ****	9.30
	No. 120		13.25
	Set of drills for case 43 ½C, 1/8 to 1 1/32 inch by 32ds. List 120		39.80

COMMON SENSE EXPANSION REAMERS



PLATE 7920

(Eccentric Flutes)

Diam. Inches	Price Each	Length of Flute Inches	Length Over All Inches	Diam. Inches	Price Each	Length of Flute Inches	Length Over All Inches
(4 9 2 6 1 1 2) (5 2 2 7 1 1 1 2 1) (1 1 2 2 1 2 1 2 1 2 1 2 2 2 1 2 1 2 2 2 2 1 2	3.00 3.05 3.10 3.15 3.20 3.25 3.30 3.35 3.40 4.00 4.20 4.40 4.80 5.00 5.25 5.75 6.00	2 2 2 2 2 2 2 2 2 2 2 2 3 3 3 3 3 4 4 4 4	33 4 4 4 4 4 5 5 5 5 5 6 6 6 6 7 7 7 7 7 8	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	6.50 6.75 7.25 7.75 8.30 8.90 9.50 10.50 11.50 12.50 13.50 14.50 15.50 15.50 16.00 16.50 17.50 17.50 18.50 19.50	4 4 5 5 5 5 5 5 5 5 5 6 6 6 6 6 6 6 7 7 7 7	8 % 1 8 % 2 9 9 1 4 4 9 % 8 1 1 0 % 8 1 1 0 % 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

Limits of expansion recommended for these reamers are as follows: Sizes $\frac{1}{4}$ to $\frac{13}{15}$, .005 inch; $\frac{1}{2}$ to $\frac{31}{32}$, .008 inch; 1 inch to $1\frac{23}{32}$, .010 inch; $1\frac{3}{4}$ to $2\frac{1}{2}$ inch, .012. The pilots on these reamers are ground slightly undersize. Reamers for brass or bronze require special clearance and are so furnished on request.

All sizes and dimensions not listed are special and subject to special prices.



HAND REAMERS



PLATE 7921

(Eccentric Flutes)

Dia. Ins.	Carbon Steel Each	High Speed Each	Length of Flute Inches	Length Over All Inches	Dia. Ins.	Carbon Steel Each	High Speed Each	Length of Flute Inches	Length Over Al Inches
The state of the s	1.00 1.10 1.10 1.20 1.30 1.30 1.30 1.40 1.45 1.45 1.55 1.60 1.70 1.75 1.75 1.85 1.85 1.90 2.10 2.20 2.30 2.40 2.40 2.50 2.60 2.70 2.80 2.60 2.70 2.80 3.25 3.40 3.55 3.40 3.55 3.40 3.55 3.40 3.85 4.00 3.85	$\begin{array}{c} 3.00\\ 3.25\\ 3.25\\ 3.25\\ 3.25\\ 3.50\\ 3.50\\ 3.75\\ 3.75\\ 3.75\\ 4.25\\ 4.75\\ 4.75\\ 5.25\\ 5.75\\ 5.25\\ 5.77\\ 7.75\\ 8.50\\ 9.50\\ 10.50\\ 11.50\\ 1$	28.88.44.88.8	3 3 3 3 3 3 3 4 4 4 4 4 4 4 4 5 5 5 5 5	11111111111111111111111111111111111111	4.30 4.45 4.66 4.75 5.20 5.60 5.80 6.00 6.20 6.40 7.00 7.40 7.80 8.00 8.80 9.20 9.40 9.20 9.40 9.20 9.40 9.20 10.00 11.30 11.80 12.30 13.40 14.60 17.0	12.75 14.25 14.25 15.75 15.75 15.75 17.25 17.25 18.75 20.50 20.50 20.50 22.25 24.00 25.75 27.50 27.50 29.50 31.50 33.50 33.50 33.50 33.50 33.50 33.50 33.75 38.00 40.75 49.00 40.75 49.00 61.75 68.00 77.75 68.00 77.75 68.00 77.75 68.10 84.25	5566666666666666666666666666666666888888	11 11 12 12 12 12 12 12 12 12 12 12 12 1



TAPER SHANK JOBBERS' REAMERS



PLATE 7922

(Eccentric Flutes)

Diameter Inches	Carbon Steel Each	High Speed Each	Length of Flute Inches	Length Over All Inches	Shank Taper
\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	1.70 1.75 1.75 1.80 1.80 1.85 1.90 2.05 2.05 2.15 2.20 2.20 2.30 2.30 2.35 2.40 2.565	4.00 4.25 4.25 4.25 4.25 4.75 4.75 4.75 5.25 5.25 5.75 5.75 6.25 6.75	2 22 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	5555555555666666677888888889990	No. 1
N 11416 632 V4 61436 73V X 61466 X X 74 61436 X X X 74 61436 X X X X X X X X X X X X X X X X X X X	2.75 2.90 3.00 3.10 3.25 3.35 3.55 3.70 3.90 4.10	6. 75 7. 25 7. 25 7. 75 7. 75 8. 50 8. 50 9. 50 9. 50 10. 50	२००० ४० महिन्दिन्दिन्द्रभू ४० ४० ४५ महिन्दिन्द्रभू ४० ४० ४५ महिन्दिन्द्रभू ४० ४० ४० ४० ४० ४० ४० ४० ४० ४० ४० ४० ४०	7 16 8 8 8 8 8 8 1 1 1 1 1 1 1 1 1 1 1 1	No. 2
$\begin{array}{c} \frac{3}{3}\frac{1}{2}\\ 1\\ 1\\ \frac{1}{3}\frac{1}{2}\\ 1\\ \frac{1}{16}\\ 1\\ \frac{3}{3}\frac{3}{2}\\ 1\\ \frac{1}{3}\frac{5}{2}\\ 1\\ \frac{7}{3}\frac{1}{2}\\ 1\\ \frac{7}{3}\frac{2}{2}\\ 1\\ \frac{7}{3}$	4.25 4.45 4.60 4.80 5.00 5.15 5.35 5.50	11.50 11.50 12.50 12.50 13.75 13.75 15.25 15.25	6	10 10^{3} 8 10^{3} 8 10^{5} 8 10^{5} 8 10^{7} 8	No. 3
1 1 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2	5.90 6.05 6.25 6.50 6.70 6.95 7.20 7.45 7.70	16.75 18.25 18.25 19.75 19.75 21.50 21.50 23.25 23.25	6 1/8 8 6 1/4 4 6 6 1/5 6 6 1/5 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	11 1 8 11 1 8 12 12 12 15 12 16 12 16 12 18 12 18 13 13 18	No. 4



STANDARD TAPER PIN REAMERS



PLATE 7203

Taper 1/4-inch per foot.

Size No.	Each	Diameter at Small End Inches	Length of Flute Inches	Length Over Al Inches
000	1.50	.101	1 3/8	2
00	1.35	.114	$1\frac{1}{2}$	2 1/4
0	1.00	.119	2	2 3/4
1	1.00	.135	2 1/4	3
2 3 4 5 6 7	1.25	.152	2 1/2	$3\frac{1}{2}$
3	1.50	.160	3	4
4	1.75	.191	3	4
5	2.00	.233	3	4
6	2.25	.263	438	5 3/4
7	2.50	.331	$4\frac{1}{2}$	6
8	3.00	.398	$5\frac{1}{4}$	6 3/4
8 9 10	3.50	.482	61/8	8 9
10	4.50	. 581	7	9
11	6.00	.706	8 1/4	$\frac{11}{13}\frac{1}{3}\frac{1}{8}$
12	7.50	. 842	10	13 3/8
13	9.00	1.009	12	16
14	11.00	1.250	14	181/4

These Reamers are all of the same taper and the point of each Reamer will enter the hole reamed by the next size smaller,



MILLING CUTTERS

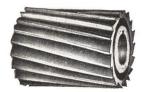


PLATE 7943

No.	Diam. of	Width of	Size of	Carbon	High Speed
	Cutter	Face	Hole	Steel	Steel
	Inches	Inches	Inches	Each	Fach
M 9 M10 M11 M12 M14 M15 M16 M17 M18 M19 M20 M21 M22 M24 M25 M26 M27 M28 M29 M30 M31 M32 M33 M34 M35 M36 M37 M38 M38 M39 M40 M41 M42		1 1 1 1 1 2 2 2 2 2 3 3 4 4 1 1 1 1 2 2 2 2 2 3 3 4 4 1 1 1 1 2 2 2 2 2 3 3 4 4 1 1 1 1 2 2 2 2 2 3 3 3 4 4 1 1 1 1 2 2 2 2 3 3 3 4 4 1 1 1 1 2 2 2 3 3 3 4 4 1 1 1 1 1 2 2 2 3 3 3 4 4 1 1 1 1 1 2 2 2 3 3 3 4 4 1 1 1 1 1 1 2 2 3 3 3 3 4 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1		1.30 1.75 2.50 3.30 1.30 1.40 1.50 1.60 1.70 1.80 1.90 2.10 2.20 2.30 2.40 2.60 2.75 2.90 3.10 3.40 4.10 4.25 4.50 5.50 1.50 1.80 1.80 1.80 1.90 2.10 3.10 3.10 3.10 3.10 4.10	2.05 2.85 4.55 5.80 2.10 2.35 2.65 2.66 2.80 3.00 3.20 3.45 3.55 3.80 4.00 4.15 5.65 6.30 6.90 7.35 7.85 8.80 9.90 11.00 2.50 2.50 8.20 8.20 8.20 8.20 8.20 8.20 8.20 8.2

CONTINUED ON FOLLOWING PAGE.



MILLING CUTTERS (CONTINUED)

No.	Diam. of	Width of	Size of	Carbon	High Speed
	Cutter	Face	Hole	Steel	Steel
	Inches	Inches	Inches	Each	Each
M44 M45 M45A M45A M45C M46 M47 M48 M49 M50 M51 M52 M53 M54 M55 M56 M57 M61 M62 M63 M64 M66 M67 M68 M67 M71 M72 M73 M74 M75 M76 M77 M78 M77 M78 M78 M78 M79 M78 M79 M78 M79 M78 M79 M78 M79 M78	24.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.	**************************************		2.00 2.10 2.30 2.50 2.85 3.10 3.25 3.40 3.75 4.00 4.20 4.60 5.00 6.00 7.40 10.00 1.35 1.60 2.25 2.40 2.55 2.70 2.85 3.30 3.60 4.20 2.55 2.70 2.85 3.90 4.00 4.00 2.55 2.70 2.85 3.90 4.00 4.00 2.75 2.70 5.90 6.90 6.90 6.90 6.90 6.90 6.90 6.90 6	3.55 3.90 4.05 4.35 5.50 6.10 6.80 7.40 7.95 9.00 11.20 12.65 15.30 19.80 2.35 2.75 3.85 4.10 4.40 4.70 4.95 5.75 6.35 7.20 7.85 8.45 9.00 10.35 11.20 12.50 12.50 13.80 16.90 22.15 2.65 3.10 3.66 4.25 4.40

Cutters of 34 inch face and over have teeth of a spiral form.

Cutters varying from the above list are made to order for any required size.

SIDE MILLING CUTTERS



PLATE 7041 SOLID TOOTH



PLATE 7042 INSERTED TOOTH

WITH SOLID TEETH

No.	Diam. Inches	Width Face Inches	Hole Inches	Car- bon Steel Each	High Speed Steel Each	No.	Diam. Inches	Width Face Inches	Hole Inches	Car- bon Steel Each	High Speed Steel Each
S 10 S 11 S 12 S 13 S 14 S 15 S 16 S 17 S 18 S 20 S 21 S 22 S 22 S 23 S 24 S 25 S 27	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	#11-74-78-76-74-78-74-66-78-7-16-78-78-7-16-78-7-18-78-7-18-78-7-18-78-7-18-78-7-18-78-7-18-78-7-18-78-7-18-78-78-78-78-78-78-78-78-78-78-78-78-78	1,17,17,18,18,18,18,18,18,18,18,18,18,18,18,18,	1.85 2.00 2.20 1.85 2.00 2.20 2.20 2.20 2.30 2.55 2.65 2.55 2.65 2.75 2.80 2.75 2.80	3.05 3.25 3.55 3.05 3.25 3.55 3.30 3.60 3.70 3.85 4.10 4.35 4.45 4.45 4.45 4.45	S 28 S 29 S 30 S 31 S 32 S 33 S 34 S 35 S 36 S 36 S 37 S 38 S 39 S 40 S 41 S 42 S 42 S 43 S 44	33 3 1/2/2/2 3 3 1/2/2/2 3 3 1/2/2/2 4 4 4 4 4 4 4 5 5 5 5 5 5 5	38-1-6-2-1-1-6-2-1-1-6-2-2-1-1-6-2-2-1-1-6-2-2-1-1-6-2-2-1-1-6-2-2-2-2	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	3.00 3.20 3.35 3.75 4.20 4.55 5.55 5.55 6.00 6.35 6.35 6.90 7.80	4.75 5.10 5.40 5.75 6.95 7.65 8.55 9.45 9.45 10.40 11.35 12.45 12.45 13.65 15.05

Solid Tooth Cutters are often used in pairs for sizing nuts, bolt heads, etc., and are then called Straddle Mills.

They have teeth upon both sides and edges. Other sizes made to order.

WITH INSERTED TEETH

No.	Diameter Laches	Width of Face Inches	Hole Inches	With Carbon Steel Blades, Each	With High Speed Steel Blades Each
S 100 S 101 S 102 S 103 S 104	6 7 8 9 10	2 2 2 2 2 2	$ \begin{array}{c} 1 \frac{1}{4} \\ 1 \frac{1}{4} \\ 1 \frac{1}{2} \\ 1 \frac{1}{2} \\ 1 \frac{1}{5} \end{array} $	21.25 25.00 27.50 30.00 32.50	21.25 25.00 27.50 30.00 32.50

Other sizes made to order. Prices on application.



END MILLS



PLATE 7045

No.	Diam. Inches	No. of Taper	Length of Cut Inches	Whole Length Inches	Carbon Steel Each	High Speed Steel Each
E 10 E 11 E 12 E 13 E 14 E 15 E 16 E 17 E 18 E 21 E 22 E 22 E 23 E 24 E 25 E 26 E 27 E 28	1.4.4.4.5.5.8.8.7.5.5.2.2.2.2.5.5.5.5.4.1.1.5.3.4.4	45 45 45 45 57 57 77	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	23 2 3 2 3 2 3 2 3 2 3 5 3 5 5 6 5 6 5 6 5 6 5 6 5 6 5 6 5 6	1.00 1.15 1.00 1.15 1.10 1.20 1.10 1.25 1.30 1.45 1.45 1.50 1.45 1.70 1.70 1.70 1.90	1.40 1.70 1.40 1.70 1.55 1.75 1.55 1.80 2.40 2.20 2.80 2.85 3.75 3.85 3.35
E 29 E 30 E 31 E 32 E 33 E 33 E 33 E 33 E 33 E 33 E 33	11 11 11 11 11 11 11 11 11 11 11 11 11	97979797979799999999999999999999999999	1	657 57 57 57 57 57 57 67 67 67 77 77 77 77	2.00 2.10 2.25 2.10 2.25 2.15 2.30 2.15 2.35 2.25 2.25 2.25 2.25 2.25 2.25 2.2	4.05 3.55 4.25 3.70 4.25 3.89 4.35 4.40 4.20 4.60 4.40 4.45 5.10 5.75 6.25 6.50 6.85 7.45 8.30



PATENT INVOLUTE CUTTERS

FOR TEETH OF GEAR WHEELS



PLATE 7040

REGULAR NUMBERS Eight cutters for each pitch

Number 1 2 3 4 5 6 7 8

Range 135 to a Rack 55to134 35 to 54 26 to 34 21 to 25 17 to 20 14 to 16 12 to 13

HALF NUMBERS

Number	$1\frac{1}{2}$	2 1/2	3 1/2	4 1/2	5 1/2	6 1/2	7 1/2
Range teeth	80 to 134	42 to 54	30 to 34	23 to 25	19 to 20	15 to 16	13

	Diam.	Size	Per C	utter	1	Diam.	Size	Per (Cutter
Pitch	of Cutter Carbon Steel In.	of Hole Inches	Carbon Steel	High Speed Steel	Pitch	of Cutter Carbon Steel, In.	of Hole Inches	Carbon Steel	High Speed Steel
*1	8 1/2	2	45.00	85.00	10	21/4	7/8	3.50	5.00
*1 1/4	7 3/4	2	38.00	70.00	11	21/4	7/8/8/8/8/8/8/8/8/8/8/8/8/8/8/8/8/8/8/8	3.30	4.50
*11/2	7	1 3/4	32.00	55.00	12	2 1/8 2 1/8	7/8	3.10	4.25
*1 34	6 1/2	1 3/4	24.00	45.00	*13	21/8	7/8	2.90	4.00
2	5 3/4	1 1/2	16.00	35.00	14	2	7/8	2.70	3.75
*2 1/4	5 3/4	1 1/2	13.00	28.00	*15	2 2 2	7/8	2.60	3.60
21/2	5 1/2	1 1/2	11.00	23.00	16	2	7/8	2.50	3.50
*2 34	6 1/2 5 3/4 5 1/2 5 1/8 5 1/8	$1\frac{1}{2}$	10.00	20.00	18	1 7/8	7/8	2.40	3.40
3	4 %	1 1/4	8.00	18.00	20	1 7/8	7/8	2.30	3.30
*3 1/4	4 1/4	1 1/4	7.00	16.00	22	$\frac{1}{3}\frac{7}{8}$ $\frac{1}{3}\frac{3}{4}$	7/8 7/8 7/8 7/8	2.20	3.20
*3 1/2	4 1/8	1 1/4	6.75	14.00	24	1 3/4	28	2.10	3.10
*3 3/4	4	1 1/4	6.50	13.00	26	1 34	1/8	2.00	3.00
4	3 7/8	1 1/4	6.00	12.00	28	1 3/4	8	1.80	3.00
$^{*4}_{5}^{1/2}$	3 34	1 1/4	5.50	11.00	30	1 3/4	/8	1.80	3.00
9	3 5/8	11/4	5.00	10.00	32	$1\frac{3}{4}$ $1\frac{3}{4}$ $1\frac{3}{4}$ $1\frac{3}{4}$ $1\frac{3}{4}$	7/8 7/8 7/8	1.80	3.00
*51/2	3 5/8	11/4	5.00	9.00	*34	1 3/4	28	1.80	3.00
0	3	1	4.30	8.00	36.	$1\frac{34}{134}$	1/8	1.80	3.00
6 7 8 9	27/8	1	4.10	7.00	*38	1 34	7/8 7/8 7/8 7/8	1.80	3.00
8	27/8	1	3.90	6.00	40	1 3/4	78	1.80	3.00
9	2 3/4	1	3.70	5.50	*44	1 3/4	78	1.80	3.00
				1	48	1 3/4	7/8	1.80	3.0

^{*}Cutters marked * are not kept in stock, but are made to order. All gears of same pitch cut with these Cutters are interchangeable.



BOLTS MACHINE

Adopted July 16, 1912, to take effect August 1, 1912



PLATE 4778

PRICE PER HUNDRED

Length Inches	1/4	5 16	3/8	7 16	1/2	$\operatorname*{and}_{\frac{5}{8}}$	3/4	7/8	1	11/8	11/4
11/2	1.70	2.00	2.40	2.80	3.60	5.20	7.70	10.50	15.10	22.50	30.00
2	1.78	2.12	2.56	3.00	3.86	5.58	8.25	11.20	16.00	23.70	31.50
$\frac{2\frac{1}{2}}{3}$	1.86	2.24	2.72	3.20	4.12	5.96	8.80	11.90	16.90	24.90	33.00
3	1.94	2.36	2.88	3.40	4.38	6.34	9.35	12.60	17.80	26.10	34.50
3 1/2	2.02	2.48	3.04	3.60	4.64	6.72	9.90	13.30	18.70	27.30	36.00
4	2.10	2.60	3.20	3.80	4.90	7.10	10.45	14.00	19.60	28.50	37.50
4 1/2	2.18	2.72	3.36	4.00	5.16	7.48	11.00	14.70	20.50	29.70	39.00
5	2.26	2.84	3.52	4.20	5.42	7.86	11.55	15.40	21.40	30.90	40.50
5 1/2	2.34	2.96	3.68	4.40	5.68	8.24	12.10	16.10	22.30	32.10	42.00
6	2.42	3.08	3.84	4.60	5.94	8.62	12.65	16.80	23.20	33.30	43.50
6 1/2	2.50	3.20	4.00	4.80	6.20	9.00	13.20	17.50	24.10	34.50	45.00
7	2.58	3.32	4.16	5.00	6.46	9.38	13.75	18.20	25.00	35.70	46.50
7 1/2	2.66	3.44	4.32	5.20	6.72	9.76	14.30	18.90	25.90	36.90	48.00
8	2.74	3.56	4.48	5.40	6.98	10.14	14.85	19.60	26.80	38.10	49.50
9	2.90	3.80	4.80	5.80	7.50	10.90	15.95	21.00	28.60	40.50	52.50
10	3.06	4.04	5.12	6.20	8.02	11.66	17.05	22.40	30.40	42.90	55.50
11	3.22	4.28	5.44	6.60	8.54	12.42	18.15	23.80	32.20	45.30	58.50
12	3.38	4.52	5.76	7.00	9.06	13.18	19.25	25.20	34.00	47.70	61.50
13			6.08	7.40	9.58	13.94	20.35	26.60	35.80	50.10	64.50 67.50
14			6.40	7.80	10.10	14.70	21.45	28.00	37.60	52.50	70.50
15			6.72	8.20	10.62	15.46	22.55	29.40	39.40	54.90	73.50
16			7.04	8.60	11.14	16.22	23.65	30.80	41.20	57.30	
17			7.36	9.00	11.66	16.98	24.75	32.20	43.00	59.70	76.50 79.50
18				9.40	12.18	17.74	25.85	33.60	44.80	62.10	
19		V 400 1 P	8.00	9.80	12.70	18.50	26.95	35.00	46.60	64.50	82.50
20			8.32	10.20	13.22	19.26	28.05	36.40	48.40	66.90	85.50
21					13.74	20.02	29.15	37.80	50.20		88.50
22					14.26	20.78	30.25	39.20	52.00		91.50
23					14.78	21.54	31.35	40.60	53.80		94.50
24	DESCRIPTION OF				15.30	22.30	32.45	42.00	55.60		97.50
25					15.82	23.06	33.55	43.40	57.40		100.50
26							34.65	44.80	59.20		103.50
27											106.50
28											109.5
29	1						. 37.95				112.5
30	1							50.40	66.40	90.90	115.5

The following extras are understood as a part of this list:
Bolts with Hexagon Heads or Hexagon Nuts, 10 per cent. extra.
If both Hexagon Heads and Hexagon Nuts, 20 per cent. extra.
Joint Bolts with Oblong Nuts, 20 per cent. extra.
Bolts with Tee Heads, Askew Heads, and Eccentric Heads, 10 per cent. extra.
Bolts with Cube Heads, 20 per cent. extra.
Bolts requiring extra upsets to form the head, 20 per cent. extra for each upset.
Special Bolts with irregular threads and unusual dimensions of heads or nuts will harved extra at the discretion of the manufacturer.

Button Heads and Counter Sunk Heads, round neck, take above list.
Bolts without nuts, 6 inches and shorter, 10 per cent, additional discount.
Longer than 6 inches, 5 per cent, additional discount.



CARRIAGE BOLTS

MANUFACTURERS' STANDARD LIST

November 1, 1912



PLATE 7729

PRICE PER HUNDRED

Length in Inches	1/4	5 16	3/8	7 16	1/2	9 and 5/8	34
$\frac{1}{2}\frac{1}{2}$	1.00	1.40	1.90	2.20			
2	1.10	1.52	2.06	2.40			
2½ 3	1.20	1.64	2.22	2.60	3.25	5.75	8.50
3	1.30	1.76	2.38	2.80	3.53	6.13	9.00
3 1/2	1.40	1.88	2.54	3.00	3.81	6.51	9.50
4	1.50	2.00	2.70	3.20	4.09	6.89	10.00
4 1/2	1.60	2.12	2.86	3.40	4.37	7.27	10.50
5	1.70	2.24	3.02	3.60	4.65	7.65	11.00
5 1/2	1.80	2.36	3.18	3.80	4.93	8.03	11.50
6	1.90	2.48	3.34	4.00	5.21	8.41	12.00
6½ 7	2.00	2.60	3.50	4.20	5.49	8.79	12.50
7	2.10	2.72	3.66	4.40	5.77	9.17	13.00
7 1 2 8	2.20	2.84	3.82	4.60	6.05	9.55	13.50
8	2.30	2.96	3.98	4.80	6.33	9.93	14.00
81/2	2.40	3.08	4.14	5.00	6.61	10.31	14.50
9	2.50	3.20	4.30	5.20	6.89	10.69	15.00
$9\frac{1}{2}$	2.60	3.32	4 46	5.40	7.17	11.07	15.50
10	2.70	3.44	4.62	5.60	7.45	11.45	16.00
11	2.90	3.68	4.94	6.00	8.01	12.21	17.00
12	3.10	3.92	5.26	6.40	8.57	12.97	18.00
13	3.30	4.16	5.58	6.80	9.13	13.73	19.00
14	3.50	4.40	5.00	7.20	9.69	14.49	20.00
15	3.70	4.64	6.22	7.60	10.25	15.25	21.00
16	3.90	4.88	6.54	8.00	10.81	16.01	22.00
17	4.10	5.12	6.86	8.40	11.37	16.77	23.00
18	4.30	5.36	7.18	8.80	11.93	17.53	24.00
19	4.50	5.60	7.50	9.20	12 49	18.29	25.00
20	4.70	5.84	7.82	9 60	13.05	19.05	26.00

Bolts with Hexagon Nuts, 15 per cent. extra.

Intermediate lengths take next higher list.

Larger diameters take Machine Bolt List.

COACH SCREWS AND LAG



PLATE 5365

MANUFACTURERS' STANDARD LIST

PRICE PER HUNDRED WITH SQUARE HEADS

Revised List in effect on and after November 12, 1908

Length	16	3/8	7 16	$\frac{1}{2}$	16 & 5/8	3/4	7/8	1
13/2	2.25	2.70	3.15	3.75				
2	2.45	2.96	3.47	4.11	6.00			
2 1/2	2.65	3.22	3.79	4.47	6.50	9.20		
3	2.85	3.48	4.11	4.83	7.00	9.90	15.00	
3 1/2	3.05	3.74	4.43	5.19	7.50	10.60	16.00	22.00
4	3.25	4.00	4.75	5.55	8.00	11.30	17.00	23.30
$\frac{4}{5}^{1/2}$	3.45	4.26	5.07	5.91	8.50	12.00	18.00	24.60
5	3.65	4.52	5.39	6.27	9.00	12.70	19.00	25.90
5 1/2	3.85	4.78	5.71	6.63	9.50	13.40	20.00	27.20
6	4.05	5.04	6.03	6.99	10.00	14.10	21.00	28,50
6 1/2			6.35	7.35	10.50	14.80	22.00	29,80
7			6.67	7.71	11.00	15.50	23.00	31.10
7 1/2			6.99	8.07	11.50	16.20	24.00	32.40
8			7.31	8.43	12.00	16.90	25.00	33.70
9			7.95	9.15	13.00	18.30	27.00	36.30
10				9.87	14.00	19.70	29.00	38.90
11				10.59	15.00	21.10	31.00	41.50
12				11.31	16.00	22,50	33.00	44.10

These list prices apply only on lots of not less than 100 of a size.
Coach or Lag Screws with Hexagon Heads, 10 per cent. extra.
Ore Washery Screws at special price.
Skein Screws are sold at the same list price as Lag Screws.
Lag Screws up to \(^{9}\xi_{0}\) diameter and 6 inches long will be put up in paper packages, at customers' request, without extra charge.
Length of Coach and Lag Screws is measured under head,

TURNBUCKLES



PLATE 5366 RIGHT HAND THREAD ONE END. LEFT HAND THREAD OTHER END

Size	Price	Size	Price
3/8 incheseacl	1 .40	1 1/4 inches	each 1.25
⁷ / ₁₆ incheseacl	1 .42	1 3/8 inches	each 1.38
½ incheseacl	1 .45	1 ½ inches	each 1.50
5% incheseacl	1 .50	1 5/8 inches	each 1.75
34 incheseach	1 .63	1 34 inches	each 2.00
% incheseacl		1 7% inches	
1 incheseach		2 inches	each 2.65
1 1/8 incheseach	1.00		



BOLT ENDS WITH SQUARE NUTS



PLATE 7741

Size of IronInches	5 16	38	7 16	1/2	5/8	34	7/8	1	11/8	11/4	1 3/8	11/2	15/8	1 34	117%	2
Length Inches Length Thread Inches Per Pound	6 1 .20	7 1 ½ 18	7 135 16	8 2 ½ 14	9 3 12	$\frac{10}{3\frac{1}{2}}$	11 3 ½ 10	12 4	13 4 ½ 10	14 5	15 5 ½	16 6	17 6 ½	18 7	19 7 ½	20 8

With Hexagon Nuts, 10 per cent. extra. Special lengths, or larger and smaller sizes, made to order, and charged extra at our discretion.

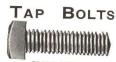


PLATE 7742 PRICE PER HUNDRED

To !									
Diameter of Screw Length	1/4	15 16	3%	7 16	1/2	and 5/8	3/4	7/8	1
1 ½ 1 ½ 2 ½ 2 ½ 2 ½ 2 ½ 3 ½ 3 ½ 3 ½ 3 ½ 3 ½ 4	1.00 1.05 1.10 1.15 1.20 1.25 1.30	1.15 1.21 1.27 1.33 1.39 1.45 1.51 1.57	1.35 1.42 1.49 1.56 1.63 1.70 1.77 1.84 1.91	1.60 1.69 1.78 1.87 1.96 2.05 2.14 2.23 2.32 2.41	2.00 2.10 2.20 2.30 2.40 2.50 2.60 2.70 2.80 2.90 3.00	3.00 3.12 3.24 3.36 3.48 3.60 3.72 3.84 3.96 4.08 4.20	4.20 4.35 4.50 4.65 4.80 4.95 5.10 5.25 5.40 5.55 5.70	6.00 6.20 6.40 6.60 6.80 7.00 7.20 7.40 7.60 7.80 8.00	8.00 8.25 8.50 8.75 9.00 9.25 9.50 9.75 10.00 10.25 10.50
Add for each 1/2 inch		.25	.30	.40	.50	.60	.75	.95	1.20

The following extra is understood as a part of this list: With Hexagon Heads, 10 per cent. extra.

Tap Bolts milled under head special price on application,

HANGER



PLATE 7743

Diameter Inches	Length Inches	Per Pound
54 84 75	4 to 6 5 to 7 6 to 8 7 to 9 8 to 12	Prices on

With Hexagon Nuts, 10 per cent. extra.



BRASS MACHINE SCREWS

Adopted November 18th, 1912

ROUND AND FLAT HEADS



PLATE 7737

PER GROSS

en'h	2	3	4	5	6	8	10	12	14	16	18	20	24	28	30	34
1/8	.3?	.32	- <u>-</u>	.46	.46	.70										
$\frac{3}{16}$.32		.36	.46	.46	.70	1.00									
1/4	.32		.36	.46	.46	.70	1.00	1.25								
5	.34		.38	.49	.49	.75	1.05	1.35	1.75							
	.36		.40	.52	.52	.80	1.10	1.45	1.85	2.90						
7	.38	.38	.42	.55	.55	.85	1.15	1.55	2.00	3.05	3.90	4.80				*15. 5.115
$\frac{1}{2}$.40		.44	.58	.58	.90	1.25	1.65	2.15	3.20	4.10	5.00	5.75			
9	.43	.43	.47	.62	.62	.95	1.35	1.75	2.30	3.35	4.30	5.25				
5/8	46	.46	.50	.66		1.00	1.45	1.85	2.45	3.50	4.50	5.50				
3/4 7/8	.52	.52	.56	.74		1.10	1.65	2.05	2.75	3.80	4.90	6.00				15.7
7/8	.58	.58	.62	.82		1.20	1.85	2.25	3.05	4.10		6.50		11.25		17.
			.70	.90	.90	1.30	2.05	2.45	3.35			7.00			15.75	18.
1/8			.80	1.05	1.05	1.45	2.20	2.65	3.55	4.65			9.00			
1/4			.90	1.20	1.20	1.60	2.35	2.85	3.75	4.90					18.75	
3/8			1.00	1.35	1.35	1.75	2.50	3.05	3.95	5.20			11.50			
1/2			1.10	1.50	1.50	1.90	2.65	3.25	4.15	5.50	6.90	9.00	12.00	18.35	22.50	26.
34			1.40	1.90	1.90	2.30	3.05	3.75	4.65	6.20	7.70	10.00	12.70	20.40	24.25	28.
.4					2.30		3.45	4.25	5.15	7.00	8.60	11,00	13.50	21.80	26.00	30.2
1/4				2.70	2.70	3.10	3.85	4.75	5.65	8.00	9.75	12.00	14 90	23.05	28.00	32.
1/2		50 50 P					4.65	5.80	6.80	9.00	10.50	13.50	15.50	25.35	30.50	35.
3/4		U S	15 10			00000	6.00	7.00	8.00	10.00	12.50	15.00	17.00	127.50	33.00	
/4	A. (25)	-00					7.50	8.50	9.50	11.00	15.00	16.50	19.00	29.50	36.00	
1/4							9.00	10.50	11.50	15 00	17.50	18.50	22.50	33.75	39.50	
1/2							11.00	12 50	15.00	18.00	19.50	22.00	25.50	37.50	42.75	
3/4							13 50	15 00	18.50	20.00	22.50	25.00	28.00	40.25	46 60	
74							16.50	18.00	22.00	25.00	26.50	28.00	32.00	44.25	29.50	
							10.00	20.00		-0100					Towns and	
			32	32	30	30	24.30	20	20	16.18	16	16				
hr'd	56	48		and				and	and	and	and	and	16			
LIII (I	00	10	36	36	32	32	32	24	24	20	18	18				



IRON MACHINE SCREWS

Adopted November 18th, 1912

ROUND, FLAT AND FILLISTER HEADS



PLATE 7738

PER GROSS

Nos	. 2	3	4	5	6	8	10	12	14	16	18	20	24	28	30	34
LengthIn																
1/8	.30	.30	.30													
16	.30 .32	$.30 \\ .32$.35 .35 .37 .37		.40	6.65	75	.90	1.15 1.15						
76	.34	.34	.34	.39		.48	.70	.80	.95	$\frac{1.20}{1.20}$	1.60 1.60 1.70	$\frac{2.00}{2.00}$	$2.40 \\ 2.40$			
5/8	.37 .41	.37 .41	.37 .41 .45	.42 .46 .50	.42 .46	.52	.75 .80	.85	$\frac{1.00}{1.05}$	$\frac{1.25}{1.30}$	1.70 1.80 1.90	2.10 2.20 2.30	$\frac{2.50}{2.60}$	3.20		
1/8			.50 .55 .60	.55 .60 .65	.55 .60 .65	.70 .75	$\frac{1.00}{1.10}$	$\frac{1.10}{1.20}$	$\frac{1.35}{1.45}$	$\frac{1.60}{1.75}$	2.40	$\frac{260}{2.80}$	3.00 3.20	$\frac{4.00}{4.35}$	$5.00 \\ 5.25$	6.6 7.0 7.3
$\frac{3}{8}$.65 .70 .90	.70 .75 .95	.70 .75 .95	$\frac{.85}{1.05}$	$\frac{1.30}{1.50}$	$\frac{1.40}{1.60}$		$\frac{2.10}{2.50}$	$\frac{2.80}{3.20}$	3.00 3.20 3.60	3.60 4.20	5.10 5.70	6.00 6.65	8.0
$\frac{1}{4}$				1.25	1.25	$\frac{1.45}{1.65}$	$\frac{1.90}{2.20}$	$\frac{2.20}{2.50}$	2.20 2.60 2.80 3.20	$\frac{3.30}{3.50}$	$\frac{4.00}{4.40}$	4.00 4.40 4.90 5.40	4.60 4.80 5.30 5.90	6.35 6.90 7.75 8.60		11.5
14						2.30	$\frac{2.90}{3.30}$	$\frac{3.50}{4.25}$	3.80 4.50 5.25	$\frac{4.50}{5.50}$	5.60	$\frac{6.00}{7.00}$	7.40 8.80	$9.70 \\ 11.50$	11.00 13.00 15.00	
34									6.00	7.50	8.50	9.25	12,20	14.70	17.50 20.50	
hreads	56	48	32 and 36	32 and 36	30 and 32	30 and 32	24 30 and 32	20 and 24	20 and 24	16 18 and 20	16 and 18	16 and 18	16			

Square Head	RON Hexagon Head	CAP Fillister Head	SCF Round Head	REWS Flat Head	Button Head
				THILL FILL THE STATE OF THE STA	- muchinement

PLATE 8094

SQUARE	AND	HE)	(AGC	N F	HEAD	CA	P SC	REW	/S-P	rice p	er Hu	ndred
Diameter of Square Head	3/8	7 16	1/2	9 16	5/8	11 16	3/4	7/8	11/8	11/4	1 3/8	1 ½
Diameter of Hexagon Head	7 16	1/2	9 16	5/8	3/4	13 16	7/8	1	1 1/8	11/4	1 3/8	1 ½
Length of Head	1/4	5 16	3/8	7 16	1/2	9 16	5/8	3/4	7/8	1	11/8	1 1/4
Diameter of Screw	1/4	5 16	3/8	7 16	1/2	9 16	5/8	3/4	7/8	1	11/8	1 1/4
Length under Head to Extreme Point 9 + + + + 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	3.00 3.15 3.25 3.50 3.75 4.00 4.25 4.70 5.25 5.75 6.25	3.25 3.40 3.50 3.75 4.00 4.25 5.35 5.80 6.30 6.80		4.70 4.90 5.30 5.70 6.10 6.50 7.15 7.50 7.90 8.40 9.15 9.75 10.50	7.70 8.30 8.90 9.50 10.10 10.70 11.50 12.30 13.10 13.90	9.25 9.50 10.00 10.75 11.50 12.60 13.60 14.40 15.20 16.00 17.30 18.60 19.90	10.00 10.75 11.50 12.60 13.60 14.40 15.20 16.00 17.30 18.60 19.90 21.20 22.50	12.50 13.50 14.50 15.50 16.50 17.50 20.60 22.10 22.370 26.90 28.50 30.10	18.40 19.70 21.00 22.40 23.70 25.00 26.40 28.20 30.00 31.80 33.60 35.40 37.20 39.00	22.75 25.00 27.25 29.50 31.75 34.00 36.25 38.50 40.75 43.00 45.25 47.50 49.75	34.00 36.75 39.50 42.25 45.00 47.75 50.50 53.25 56.00 58.75 61.50	42.00 45.50 49.00 52.50 56.00 59.50 63.00 66.50 70.00 73.50 77.00
Threads to Inch	20	18	16	14	12	12	11	10	9	8	7	7
Add for each	.40	.50	. 60	.70	. 80	1.30	1.30		1.80	2.25	2.75	3.50

Square and Hexagon Head Cap Screws are regular. Fillister, Round, Flat and Button Head—Price on application.
 Round Head and Button Head Cap Screws made to order only. Price accord-

ing to quantity.

3. Flat Head Cap Screws are measured all over length.

4. All special steel, case hardened and polished screws. Price on application.



IRON SET SCREWS

FOIRT. FLAT FLOT HOUSE HANGER CONE CUP FOIRT HOUSE CONE FOIRT, DISTRIBUTION FOIRT, DISTRIBUTION FOIRT, BEAUTING CONE FOIRT, BEAUTING CO

PRICE PER HUNDRED

				PR	ICE	PER	HU	NDR	ED				
Diam. of Inches	Screw	1/4	5 16	3/8	7 16	1/2	<u>9</u> 16	5/8	3/4	7/8	1	1 1/8	1 1/4
	1/2	1.80	2.00	2.35									
	5/8	1.90	2.10	2.45	2.80	3.30							
	3/4	2.00	2.20	2.50	2.90	3.40	5.00	5.00		****			
	7/8	2.10	2.30	2.60	3.00	3.60	5.50	5.50				* KONONON	
	1	2.15	2.35	2.65	3.10	3.80	5.75	5.75	10.00				
	1 1/4	2.30	2.50	2.85	3.50	4.30	6.50	6.50	11.00	15.50			
oint.	$1\frac{1}{2}$	2.50	2.70	3.10	4.00	4.80	7.25	7.25	12.00	16.20	22.00		
e Pe	$1\frac{3}{4}$	2.75	3.00	3.50	4.50	5.40	8.00	8.00	12.80	17.70	24.00	41.70	
Length under Head to Extreme Point.	2	3.25	3.50	4.00	5.15	6.00	8.80	8.80	13.60	19.20	26.00	45.00	54.00
Ext	$2\frac{1}{4}$	3.75	4.00	4.50	5.75	6.75	9.60	9.60	14.50	20.70	28.00	48.30	58.30
1 to	$2\frac{1}{2}$	4.25	4.50	5.00	6.35	7.50	10.40	10.40	15.40	22.20	30.00	51.60	62.6
Неас	234.	4.75	5.00	5.50	6.75	8.25	11.20	11.20	16.30	23.70	32.00	54.90	66.9
ler]	3	5.25	5.50	6.00	7.20	9.00	12.00	12.00	17.30	25.20	34.00	58.20	71.20
oun	3 1/4				7.60	9.75	12.75	12.75	18.40	26.70	36.00	61.50	75.50
igth	$3\frac{1}{2}$				8.00	10.50	13.50	13.50	19.50	28.20	38.00	64.80	79.80
Ler	3 3/4			E 6000	8.50	11.25	14.30	14.30	20.75	29.70	40.00	68.10	84.10
	4				9.00	12.00	15.10	15.10	22.00	31.20	42.00	71.40	88.40
	4 1/4							15.90	23.50	32.70	44.00	74.70	92.70
	$4\frac{1}{2}$							16.70	25.00	34.20	46.00	78.00	97.00
	4 3/4	AURIO 16	X 8.83	ков к			****		26.50	35.70	48.00	81.30	101.30
	5	100000 00		1010 I						37.20	50.00	84.60	105.60
Threads t	o inch.	20	18	16	14	12	12	11	10	9	8	7	7
Add for ea		. 50	. 60	.70	.80	. 90	1.10	1.10	1.50	1.70	2.25	3.30	4.30

Cup and Oval Point Set Screws are regular. All others special—Price based on quantity.
 Headless Set Screws or Gib Screws take same lists as regular, measurements being taken all over.

taken all over.

3. Hexagon Head Set Screws takes 25 per cent. over net prices—Made to order only.

4. All special steel, case hardened and polished screws. Price on application.



"MAC-IT" **SCREWS**

MAC-IT Screws will not twist off or mushroom at the point.



PLATE 8011 FIG. 2

PLATE 8012 FIG. 3

Figs. 2 and 3 are photographic reproductions of actual tests made of regular stock Mac-It Screws by two large consumers.

This method of determining the great strength of Mac-It Screws has proven so satisfied.

factory that we have made up a large quantity of steel blocks similar to Fig. 3, and shall be pleased to send a sample set screw and test block to anyone interested in a stronger and more serviceable screw.

SG	QUAF	RE	HEA	D S	ET S	SCRI	EWS	—PRI	CE PE	RHUN	IDRED)
Diam	1/4	5 16	3/8	7 16	1/2	16	5/8	3/4	7/8	1	1 1/8	11/4
Threads.	20	18	16	14	12-13	12	11	10	9	8	7	7
Length			Siz	es No	t Show	n take	Price	Next 1	Larger S	Size		
Length 12 34 1 14 1 13 1 14 1 13 1 14	9.70	8.95 9.55 10.15 10.75 11.35	6 .45 6 .85 7 7 .25 7 7 .65 8 .05 7 7 .65 8 .05 11 1.25 11 2 .05 11 2 .05 12 .0	7 .40 7 .90 8 .40 8 .90 10 .90 11 .90 13 .90 15 .90 16 .90 20 .90 22 .90 24 .90 28 .90	8.90 9.40 9.90 10.40 12.40 11.	11. 40 12. 00 12. 00 13. 80 15. 00 17. 40 18. 60 21. 00 22. 20 22. 20 22. 20 22. 20 23. 40 24. 60 27. 00 29. 40 39. 00 43. 80	12.50 13.20 15.30 15.30 16.70 19.50 20.90 23.70 26.50 27.90 30.70 33.50 41.90 47.50	17, 20 18, 90 20, 60 24, 00 25, 70 29, 10 30, 80 32, 50 34, 20 37, 60 41, 00 64, 80 71, 60 64, 80 71, 60 85, 20	21 50 24 00 26 50 29 00 31 50 34 00 36 50 39 00 41 50 44 00 45 50 56 50 61 50 66 50 71 50 81 50	40.00 44.30 48.60 52.90 57.20 65.80 70.10 74.40 78.70 83.00 87.30 91.60 100.20 1126.00 1136.00 117.40 1156.00 1176.00 116	63 00 75 00 81 00 87 00 93 00 105 00 117 00 123 00 147 00 159 00 171 00 195 00 207 00 219 00 223 00 243 00 255 00 279 00 279 00 291 00	79, 55 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7

Square head set screws carried in stock in cup and dog points and U.S. S. threads only.

"MAC-IT" SAFETY OR HOLLOW SET SCREWS



Sizes not shown are special.

PLATE 8013 FIG.4
One wrench with each 25 screws.

Diam. of Screw	3/8	7 16	1/2	9 16	5/8	3/4	7/8	1
Threads to Inch	16	14	12-13	12	11	10	9	8
3/8	5.00	6.00	7.00				N ANNUA IA	
16	5.00	6.00	7.00					
1/2	5.00	6.00	7.00					
16	6.00	7.00	7.00	8.00				
5/8	6.00	7.00	7.00	8.00	10.00	10.00		10000000
3/4	6.00	7.00	8.00	9.00	10.00	12.00	11.89	
8	7.00	8.00	8.50	9.00	11.00	12.00	15.00	20.00
1	7.00	8.00	9.00	9.50	12.00	13.00	15.00	20.00
211/8	7.25	9.00	11.00	11.50	13.00	14.00	15.00	20.00
	7.50	9.50	11.00	12.00	14.00	16.00	18.00	20.00
11/2 12 Tendry 12 2 1/4	7.75	10.00	11.50	13.00	16.00	20.00	22.00	24.00
₹134	8.00	10.50	12.00	14.50	18.00	22.00	26.00	28.00
g2	8.25	11.00	13.00	16.00	20.00	24.00	32.00	34.00
$\begin{array}{cccccccccccccccccccccccccccccccccccc$			13.50	17.50	22.00	26.00	34.00	36.00
$-2\frac{1}{2}$			14.00	18.50	24.00	28.00	37.00	40.00
2 34			14.50	19.50	25.00	30.00	40.50	44.00
3			15.00	20.00	26.00	32.00	43.25	48.00
31/4						34.00	46.00	50.00
3 ½						36.00	48.00	52.00
4						42.00	50.00	54.00
Extra Wrenches ea.	.05	.08	.08	.09	.09	.10	.12	.14

Safety screws carried in stock only in cup points and U.S.S. thread. For special and smaller safety screws see information on second page following. Angle wrenches furnished if preferred.

SAFETY SET SCREWS

Hollow safety set screws are not carried in stock in diameters less than $\frac{3}{2}$ inch, but are made to order in the $\frac{1}{16}$ and $\frac{1}{2}$ inch sizes in lots of 1,000 or more at the same prices as the $\frac{3}{2}$ inch screws. We recommend that for the $\frac{3}{16}$ and $\frac{1}{2}$ inch screws the use of the Mac-It Headless Screws slotted for the screw-driver. These screws will not split.

Safety set screws are carried in stock with cup points only—all other types are considered special.

SQUARE HEAD SET SCREWS

Square head set screws are carried in stock in cup and dog points—other types are furnished on orders only.

"MAC-IT" TOOL POST SCREWS



PLATE 8014 FIG. 5
Size of square head equal to the diameter of the screw.

Mac-It quality is especially valuable for the severe service required of these screws.

They have been standardized by several of the largest machine builders.

PRICE PER HUNDRED

Diam	3/8	$\frac{7}{16}$	1/2	16	5/8	34	1/8	1
Thread	16	14	12-13	12	11	10	9	8
Length		Leng	th Under	Collar t	o End of	Point.		
1	23.05	23.90						1
1 1/4	23.85	24.90						1111
1 ½	24.65	25.90	27.40	30.00				
1 3/4	25.45	26.90	28.40	31.20				
2	26.25	27.90	29.40	32.40	37.50	45.00	55.50	84.2
21/4	27.05	28.90	30.40	33.60	38.90	46.70	58.00	88.5
2 ½	27.85	29.90	31.40	34.80	40.30	48.40	60.50	92.8
234	28.65	30.90	32.40	36.00	41.70	50.10	63.00	97.1
3	29.45	31.90	33.40	37.20	43.10	51.80	65.50	101.4
3 1/4				38.40	44.50	53.50	68.00	105.7
3 1/2				39.60	45.90	55.20	70.50	110.0
3 3/4					47.30	56.90	73.00	114.3
4	F F F F F F				48.70	58.60	75.50	118.60

Stock screws have U. S. S. threads.

TOOL POST SCREWS

Tool Post Screws are carried in stock with dog points and standard heads and collars. Special screws furnished to specifications.

SPECIAL "MAC-IT" SCREWS

We are equipped to furnish a wide variety of special screws, but owing to the cost of setting up the machines and other additional expense, we can accept orders only in lots of 1000 or more of a size.

All stock screws have U.S.S. threads.

V threads are considered special and are furnished only when so ordered.

When placing orders for special screws blue prints or sample screws should be furnished.

We cannot accept cancellations of orders for special screws, nor can we accept the return of any screws not regular stock.

In estimating the stock and machine output the quantity of finished screws may vary slightly from the quantity ordered, in which case the actual quantity made will be shipped and invoiced to our customers.

HOT PRESSED NUTS

UNITED STATES STANDARD LIST

Association Standard List, taking effect January 1, 1906



PLATE 5370 SQUARE



PLATE 5371 HEXAGON

Width	Thick	Hole	Bolt	Price pe	uare er Lb. in o. Kegs	Hex Price po 200-lb	agon er Lb. in o. Kegs
				Blank	Tapped	Blank	Tapped
Inches	Inches	Inches	Inches	Cents	Cents	Cents	Cents
1284年8年7月4年8月14年8月14日 - 1878年8月14日 - 1878年814年81184年8184181 - 1878年81848 - 1878年81848 - 1878年81	14	7.1.1.16.1.2.2.2.2.2.3.3.3.3.3.3.3.3.3.3.3.3.3.3	14	13 12 10.5 10 9 9 8.7 8.5 8.4 8.4 8.4 8.5 9.3 9.3 9.7 10 10.3 10.5 11.5	15 13.5 11.6 10.9 9.7 9.6 9.2 8.9 8.8 8.8 8.8 9 9.4 9.7 10.3 10.6 11 11.5 11.5 11.5 12.4 13	20 18 14 13 11.2 10.5 10 9.9 9.9 10 10.3 10.5 10.8 11.2 11.7 11.7 11.7 12.4 13 15.5	22.5 20 15.6 14.3 12.2 12.1 11.2 10.6 10.5 10.5 10.7 11.1 11.4 11.7 12 12.3 12.9 13.6 13.9 14.6



COLD PUNCHED NUTS

CHAMFERED, TRIMMED AND REAMED



PLATE 5755

U. S. STANDARD SIZES

List amended December 20, 1905, to take effect January 1, 1906.

These prices apply only on quantities of 200 pounds or more of a size.

Short	Thick-	Diameter of	G: f	Sq	uare	Hex	agon
Diam. Inches	ness Inches	Hole Inches	Size of Bolt Inches	Cents po	er Pound		er Pound
		Thenes	Thenes	Diank	Tapped	Blank	Tapped
1/2	1/4	$\frac{3}{16}$ scant	1/1	20.0	22.0	27.0	29.5
19 32	16	1/4 scant	5	18.0	19.5	24.0	26.0
116	3/8	19 scant	1/4 5/16 3/8 7/16	14.5	15.6	18.5	20.1
25 32	7 16	11	76	14.0	14.9	18.0	19.3
7/8	1/2	$\frac{13}{32}$ scant $\frac{29}{64}$		11.3	12.0	14.0	15.0
31	9 16	29 64	9	11.3	11.9	14.0	14.9
$1\frac{1}{16}$	5/8	½ full	5/8	10.0	10.5	12.5	13.2
1/219/21/65/27/81/21/65/27/81/21/65/27/81/21/65/27/81/21/65/27/81/21/65/27/81/65/25/27/81/65/25/27/81/65/25/27/81/65/25/25/25/27/81/65/25/25/25/25/25/25/25/25/25/25/25/25/25	1/4 516 3/8 716 1/2 916 5/8 3/4 7/8	$\frac{5}{8}$ scant	1/2 9 16 5/8 3/4 7/8	9.7	10.1	11.4	12.0
$1_{\frac{7}{16}}$	7/8	$\frac{47}{64}$ scant	7/8	9.6	10.0	11.1	11.7
1 5/8	1	$\frac{27}{32}$ scant	1	9.6	10.0	11.1	11.7
$\begin{array}{c} 1\frac{13}{16} \\ 2\\ 2\frac{3}{16} \\ 2\frac{3}{8} \\ 8\frac{9}{16} \\ 2\frac{3}{4} \\ 2\frac{15}{16} \\ 3\frac{1}{8} \\ \end{array}$	1 1/8	$\frac{15}{16}$ full	1 1/8	9.6	10.0	11.1	11.7
2	$\frac{1}{1}\frac{1}{4}$ $\frac{1}{3}\frac{3}{8}$	$1\frac{1}{16}$ full	1 1/4	10.1	10.5	11.5	12.1
$2\frac{3}{16}$	1 3/8	$1\frac{5}{32}$ full	1 3/8	10.3	10.8	12.0	12.7
23/8	1 1/2	$1\frac{9}{32}$ full	1 1/2	10.7	11.3	12.6	13.4
$2\frac{9}{16}$	$1\frac{5}{8}$ $1\frac{3}{4}$	$1\frac{25}{64}$ scant	$\frac{1}{1}\frac{1}{5}\frac{1}{8}$	11.1	11.8	13.2	14.1
2 %	1 3/4	1½ scant	1 3/4	11.5	12.2	14.0	14.9
2 16	1 7/8	1 5/8 scant	$1\frac{3}{7}\frac{4}{8}$	12.0	12.8	14.5	15.5
	2	$1\frac{23}{32}$ scant	2	12.0	12.9	14.5	15.6
3 5 16	2 1/8	$1\frac{27}{32}$ scant	2 1/8	12.5	13.5	15.0	16.2
$\frac{31}{2}$ $\frac{11}{16}$	2 1/4	$\begin{array}{c} 1\frac{31}{32} \text{ seant} \\ 2\frac{5}{64} \text{ full} \end{array}$	2 1/4	12.5	13.6	15.0	16.3
3 16	23/8	$2\frac{5}{64}$ full	2 3/8	13.5	14.7	16.0	17.4
$3\frac{7}{8}$	$2\frac{1}{2}$	$2\frac{11}{64}$ full	$2\frac{1}{2}$	13.5	14.8	16.0	17.5

For quantities of less than 200 pounds of a size, the following extras will be charged:

At the rate of 20 cents per 100 pounds for 100 pounds or more.

At the rate of 50 cents per 100 pounds for less than 100 pounds.

When ordering Cold Punched Nuts, please state whether Plain, or Chamfered Trimmed and Reamed Nuts are wanted, and whether they are to be blank or tapped.



STANDARD WROUGHT WASHERS

ADOPTED JANUARY 20TH, 1910

U. S. STANDARD SIZES

IN 200 POUND KEGS

Diameter	Size of Hole	Thickness Wire Gauge Number	Size of Bolt	Price per 100 Lbs.	Average Number in 100 Lbs.
9 16 3/4 7/8	1/4 5 16	18	3	14.00	39,400
3/4	16	16	1/4	12.20	15,600
7/8	3/8	16	16	11.40	11,250
1	7	14	5 16 3/8 16	10.50	6,800
1 1/4	1/2	14	7 7 6	9.80	4,300
1 3/8	7.6	12	1/2	9.40	2,600
1 1/2	5/8	12	9 7.6	9.30	2,250
1 1/4 1 3/8 1 1/2 1 3/4	11	10	$\frac{\frac{1}{2}}{\frac{16}{5}}$	9.20	1,300
2	13		3,4	9.10	900
21/4	15	8	7/8	9.00	782
2 ½ 2 ½ 2 ½ 2 ¾ 3	1 16	9 8 8 8	1	9.00	568
2 34	1 1/4	8	1 1/8	9.00	473
3	1 3%	8	1 1/4	9.20	364
3 1/4	1 1/3	7	1 3/8	9.20	275
3 1/6	15%	7	1 1/2	9.20	256
3 3/4	1 34	7	15%	9 50	220
4	1 7/8	7	1 34	9.50	197
4 1/4	2	7	1 7/8	9.50	174
4 1/2	21/8	7	2	9.50	160
4 34	23%	5	21/4	10 50	122
5	25%	4	21/2	10.50	106

Add \$0.10 cwt. for 100 pound kegs.

" .20 " " 50 to 100 pound boxes.

" .30 " " 25 to 50 " "

CAST IRON WASHERS

Size of Bolt or Rod Inches	Round Washers Dimensions Inches	Round Washers Weight Pounds	Diamond Washers Weight Pounds	Diamond Washers Thickness in Centre Inches	Diamond Washers Width and Length Inches
3/8/2/8/14/8 1 1/1/3/8/24/4 1 1/1/3/8/21/2 1 1/1/3/8/21/2 1 1/1/3/4 1 1/1/3/4 2	1½ x 36 2 x 36 2½ x 56 3 3½ x 56 4 4 x 56 4 ½ x 1½ 5 x 1½ 6 x 136 7 x 1½ 7 1½ x 1½	$9\frac{1}{2}$ 21 43 70 113 175 256 332 455 610 865 1,115	215 438 750 1,300 1,860 1,860 2,800 2,800	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	4 5 8 x 8 5 3 4 x 10 7 x 12 8 x 14 9 ½ x 16 10 ½ x 18 10 ½ x 18

RELIANCE OILS



PLATE 8120

All our oils are refined from strictly Pennsylvania Crude and are of the highest grade on the market.

Prices will be sent on application.

CYLINDER OILS

S. M. & S. CO. No. 6

The highest grade of Cylinder Oil. Used where steam

pressure is 90 lbs. and over. When ordering state whether steam is wet or dry; if wet the compounding is changed to give perfect satisfaction.

ENDURO

For use where steam pressure is 90 lbs. or under. Will give absolute satisfaction under these conditions.

EXCELSIOR

Of a slightly lower grade than Enduro. For steam pressure under 90 lbs.

MARVO SPECIAL No. 1 A low pressure oil. Especially adapted for pumps. A heavy dark filtered oil. Used where a low price oil is required.

COLOPHINE

ENGINE OILS

E. M.

An exceptionally high grade oil. Suitable for all large Corliss Engines and where the highest grade of engine oil is Suitable for all types of engines, heavy looms, etc.

DIAMOND F. GEM

An excellent general service Engine oil.

Suitable for all types of engines where a low priced oil is

required.

In places where escape of steam hits engine oil or water in any form, use Radium Turbine Oil. This does not emuisify.

ROBINSON'S

ZENO

GAS ENGINE OIL

The highest grade. Suitable for all types of Gas Engines. A good general service gas engine oil.

SHAFTING OIL

S. M. & S. CO.

An oil especially compounded for use on shafting, hanger boxes, etc.

RELIANCE OILS-CONTINUED

MACHINE OILS

CASTOR Most suitable for all machines. Thrashing or any other farm machinery.

S. M. & S. No. 1 A light machine oil of general service.

X. STAINLESS For knitting or weaving machinery. Will leave absolutely no stains on fabric.

HARVESTER OILS

RUBY Absolutely best oil for farm machinery.
STAR A good general low priced oil.

FLOOR OILS

WHITE WAX

No. 1 FLOOR

Cleans and polishes a floor in one operation.

For oiling soft wood floors.

No. 2 FLOOR Of a slightly lower quality than No. 1.

AMMONIA OILS

PERFECTION Used in Ice and Refrigerating plants on Ammonia pumps. This oil will stand a cold test of 10° below zero without congealing.

AMMONIA No. 1 Of a slightly lower grade than Perfection.

DYNAMO OILS

PERFECT The best oil for all electric dynamos, motors and high speed machinery

DYNAMO No. 1 Of a slightly lower grade than Perfect.

TURBINE OIL

RADIUM Should be used on Steam Turbines and direct connected Electric belts. This oil is for high speed Turbines. For geared Turbines where dynamo runs at slower speed use Colphine Engine.

SEPARATOR OIL

XX STAINLESS The best oil for Cream Separator.

SCREW CUTTER OILS

S. M. & S. No. 1 The best oil for pipe and screw cutting.

CUTAL

A compounded oil using from twenty to fifty parts water.

Exceptional results are gained from this oil.

MOTOR OIL

ROBOSCO

This is the highest type of oil for the lubrication of all automobiles and gas engines. Refined from Pennsylvania Crude it will give perfect satisfaction. Made in three bodies, Light, Medium and Heavy.

MOTOR CYCLE OIL

ROBOSCO The best oil for motor cycle. Made in Medium and Heavy bodies.

AIR COMPRESSOR OIL

PERFECT An excellent pure oil for air compressors.

RELIANCE OILS-CONTINUED

PAINTERS OILS

RAW PAINTOLEUM

Used as a substitute for linseed.

BOILED PAINTOLEUM

Used as a substitute for linseed.

PRIME

NEATSFOOT OILS

EXTRA

For use in silk mills, etc. Absolutely the highest quality. For softening leather, oiling harness, etc.

LARD OILS

WINTER PRESSED

Absolutely pure animal product. For Bolt and Screw cutting, die sinking. Also as signal oil. Miner's oil and where a high grade burning oil is required.

PRIME A good cutting oil.

EXTRA

SPERM

Of a lower quality than Prime.

FISH OILS

WINTER PRESSED

Used by Tanneries, Spring manufacturers for tempering steel. Also by varnish and paint manufacturers.

NEWFOUNDLAND COD

Manufactured from pure fish product.

The highest type of machine oil.

RELIANCE

CRUSHER OIL Used in stone quarries, excavating purposes and by contractors.

BRICK OIL

RELIANCE

Used by brick manufacturers in making bricks, to keep the moulds from sticking.

RELIANCE

SPINDLE OIL Used in all textile mills. This oil is very light in gravity.

WOOL OIL

RELIANCE

Is used in woolen mills and worsted mills for softening

yarns.

CORN OIL

RELIANCE

Used principally as a substitute for linseed oil.

PINE OIL

RELIANCE

Used for dipping ends of posts before putting them into the ground, particularly fence posts, telegraph poles, etc.

BLACK OIL

W. VIRGINIA

A cheap dark lubricating oil for mine and pit cars, saw

mills, etc.

HARNESS OIL

RELIANCE

A mixture of pure neatsfoot oil and lamp black. Highest grade of harness oil.

GREASE

We carry a large stock of the following greases:

FLEX AXLE GREASE

RELIANCE CUP GREASE CREOIL TRANSMISSION GREASE

JOURNAL COMPOUND DIXON GRAPHITE GREASE

"AMERICAN" ALL-WROUGHT STEEL SPLIT PULLEY

THE ORIGINAL STEEL PULLEY

Maximum efficiency in a belt pulley means the transmission of power with the least cost.

Pulleys with a high percentage of belt slip not only waste power, and thus cause expense, but the belt slip wears the belt and the heat generated by the belt slip on the rim dries out the belt and this shortens its life, in both cases increasing the cost of transmitting power.

Numerous tests by reputable engineers have shown that the belt slip of an American Steel Split Pulley is less than that of any other pulley, and only about half that of a cast iron pulley.

As belt slip is a loss that increases with every pulley in a plant, the power that can be saved through the use of American Steel Split Pulleys is well worthy of consideration.

An important feature of the design of the American Steel Split Pulley is that the arms cut the air instead of fanning it. With some designs of pulleys, due to their arms fanning the air, considerable power is consumed in revolving them. In some cases the difference between the cost of rotating an "American" Pulley and another make is as much as \$1.30 per pulley per year, based on power costing \$40.00 per H. P. per year.

American Steel Split Pulleys are from 40% to 60% lighter than cast iron pulleys designed for equal service.

American Pulleys can be made to fit any size of shaft by means of interchangeable bushings. A pulley no longer needed in one part of a shop can be made to fit the shaft in another place by means of these interchangeable bushings.

American Steel Split Pulleys above 6 inches in diameter have grooved faces. Tests have shown that at full or heavy loads the grooved faced "American" Pulley transmits more horse power with less belt slip than ungrooved faces.

It is not necessary to use key-ways or set screws with "American" Pulleys except in cases of very severe service, as the hub clamp is so designed that it holds the pulley securely to the shaft. Slip on shaft is almost unknown.

"American" Pulleys are made to run tight and loose by means of split loose bushings and Faul's Cups and Candle Lubricators or Roberts' Self-Oiling Bushings.

American Steel Split Pulleys are recommended for rim speeds up to 6,000 feet per minute.

They are guaranteed for double belt service.

"American" Pulleys failing in service from any defect in material or manufacture will be replaced without charge.

American Steel Split Pulleys are provided with dowel pins in the beads of the rims. These pins allow the "American" Pulley to be mounted very readily and rapidly as they hold the halves of the pulley in place while the hub clamp and rim clamp bolts are being tightened in place. These clamping bolts are so accessible that it is an easy matter to put an "American" Pulley of average size in place during the half hour at noon.

In ordering please specify the diameter, face and bore of pulley desired, and whether Crown or Straight face.

If pulleys are ordered without either Crown or Straight face being specified, they will be supplied Crown.

"AMERICAN" ALL-WROUGHT STEEL SPLIT **PULLEYS**





PLATE 7928 Design in sizes 3'' 4'' 5'' and 6'' diameter. Six Arm Type, Sizes 7'' to 42'' inclusive



PLATE 7929 Design used in sizes 44" to 72" inclusive.



PLATE 7930 Made in sizes 12" to 120" inclusive



PLATE 7931 INTERCHANGEABLE BUSHINGS



"AMERICAN" ALL-WROUGHT STEEL SPLIT PULLEYS

Dia.	Face		Dia.	Face	r 10	Dia) T2		TV.		
Ins.	Ins.	List	Ins.	Ins.	List	Dia. Ins.	Face Ins.	List	Dia. Ins.	Face Ins.	List
3	2	2.28	12	2. 3	3.90	17	6	7.28 8.78 10.05	23	3	7.0
3	3	2.40	12	3	4.20	17	8	8.78	23	4	8.7
3	4	2.52	12	4	4.63	17	10	10 05	23	5	9.9
			12	5	4.80	17 17	12	11.25	23	6	10.5
4	2 3	$\frac{2.40}{2.52}$	12	6	5.33	17	14	12.40	23	8	12.6
4	3	2.52	12	8	5.78	17	16	13.65	23	10	14.
4	4	2.64	12	10	6.45	~.	10	10.00	23	12	18.0
4	5	2.75	12	12	7.65	18	3	5.55	23	14	21.0
			12	14	9.00	18	4	6.38	23	16	24.3
5	2	2.52	12	16	10.25	18	5	7.00	23	18	26.7
5 5 5	3	2.64		1	10.20	18	6	7.65	20	10	20.
5	4	2.75	13	2	4.05	18	8	9.30	24	3	7.5
5	5	2.87	13	3	4.35	18	10	10.65	24	4	0.6
0		2.01	13	4	4.80	18 18	12	12.00	24		8.9
6	2	3.15	13	5	5.20	18	14	13.25	24	5	10.0
6 6 6 6	3	3.30	13	5	5.62	18	16	14.50	24	8	10.9
6	4	3.45	13	8	6.43	10	10	14.50	24	10	13.2
6	5	3.75	13	10	7.20	19	3	E 90		10	15.6
6	6	4.05	13	12	8.40	19	4	5.80	24	12	19.0
O	0	4.00	13	14	9.50	19		6.75	24	14	22.6
7	2	3.22					5	7.50	24	16	26.2
7			13	16	10.75	19	6	8.25	24	18	29.9
7	3	3.38	1.4	0	1 00	19	8	10.13	24	20	34.8
7 7 7 7	4	3.60	14	2 3	4.20	19	10	11.25	1212		525
7	5	3.90	14	3	4.50	19	12	12.90	25	4	9.2
1	6	4.20	14	4	5.20	19	14	14.20	25	6	11.4
196	-		14	5	5.65	19	16	15.60	25	8	13.8
8 8 8 8 8	2	3.30	14	6	6.15				25	10	16.4
8	3	3.45	14	8	7.05	20	3	6.00	25	12	20.2
8	4	3.75	14	10	8.03	20	4	7.50	25	14	24.5
8	5	4.05	14	12	9.00	20	5	8.10	25	16	29.2
8	6	4.35	14	14	10.00	20	6	9.00	25	18	35.0
8	8	4.95	14	16	11.25	20	8	10.73	25	20	39.
8	10	5.60				20	10	12.00			0070
			15	2	4.35	20	12	14.25	26	4	9.5
9	2 3	3.38	15	3	4.65	20	14	15.30	26	6	11.9
9	3	3.60	15	4	5.45	20	16	16.90	26	8	14.4
9	4	3.90	15	5	5.80	20	18	18.59	26	10	17.
9	5	4.20	15	6	6.55				26	12	21.8
9	6	4.50	15	8	7.65	21	3	6.25	26	14	26.2
9	8	5.10	15	10	8.80	21	4	8.00	26	16	31.2
9	10	5.75	15	12	9.75	21	5	8.90	26	18	36.
5	1 - 3		15	14	10.75	21	6	9.60	26	20	41.4
10	2	3.45	15	16	12.00	21	8	11.25	20	20	41.9
10	3	3.75	10	10	12.00	21	10	12.98	28	4	10 0
10	4	4.05	16	2	4.50	21	12	15.60	28	6	10.8
10	5	4.35	16	3	4.95	21	14	18.00	28		12.3
10	6	4.65	16	4	5.75	21	16	20.55	28	8	15.4
10	8	5.25	16	5	6.10	21				10	18.1
10	10	5.90	16	6	6.90	41	18	22.60	28	12	22.9
10	12	6.45	16	8	8.25	22	9	0 50	28	14	28.
10	14	0.40				22	3	6.50	28	16	34.
11	9	9 65	16	10	9.45	22	4	8.55	28	18	40.:
11	2 3	3.65	16	12	10.50	22 22	5	9.50	28	20	46.:
		3.90	16	14	11.50	22	6	10.28	0.0		
11	4	4.20	16	16	12.65	22	8	12.00	30	4	12.0
11	9 5	4.50				22	10	14.10	30	6	14.1
11	6	4.80	4.00		W 05	22	12	16.80	30	8	17.2
11	8	5.40	17	3	5.25	22	14	19.50	30	10	19.9
11	10	6.00	17	4	6.00	22	16	21.30	36	12	24.7
11	12	6.90	17	5	6.50	22	18	23.43	30	14	31.5



"AMERICAN" ALL-WROUGHT STEEL SPLIT PULLEYS-continued

Dia. Ins.	Fac Ins		Dia. Ins.	Face Ins.	List	Dia Ins.		ce List	Dia		
30	16	38.10		4	19.50	44	14	54.00	-	_	_
30 30	18 20	45.00	38	6	21.75	44	16	61 19	50 50	28 30	145.20
30	22	49.50 55.50	38 38	8	26.40		18	69.00	50	32	159.72 175.69
30	24	61.50	38	10	31.05		20	78.00	50	34	193.25
30	26	67.50	38	12 14	$\frac{37.15}{42.75}$	44	22	87.00	50	36	212.57
30	28	74.25	38	16	51.75	44	24 26			1	
30	30	81.67	38	18	58.87	44	28	105.00 115.50		6	46.50
32		10.00	38	20	64.87	44	30	127.05	52 52	8	51.00
32	4 6	$13.20 \\ 15.45$	38	22	70.87	44	32	139.75	52	10 12	57.00
32	8	19.35	38 38	24	76.87	44	34	153.72	52	14	63.00 69.00
32	10	22.50	38	26 28	82.87	44	36	169.09	52	16	78.75
32	12	26.86	38	30	$91.15 \\ 100.26$	10			52	18	90.00
32	14	34.15	38	32	110 98	46 46	6 8	33.00	52	20	102.00
32 32	16	41.65	38	34	121.30	46	10	39.00 45.00	52 52	22	114.00
32	18 20	48.37	38	36	133.43	46	12	50.25	52	24	126.00
32	22	54.37 60.37	40		200	46	14	57.75	52	26 28	138.00
32 32	24	66.37	40 40	4	21.00	46	16	64.50	52	30	$151.80 \\ 166.98$
32	26	72.37	40	6 8	24.00	46	18	72.00	52	32	183.67
32	28	79.60	40	10	$28.50 \\ 33.75$	46 46	20	81.00	52	34	202.03
32	30	87.56	40	12	40.15	46	22 24	90.00	52	36	222.23
32	32	96.31	40	14	46.50	46	26	99.00 108.00	E 4	0	
34	4	14 40	40	16	55.15	46	28	118.80	54 54	6 8	50.25
34	6	14.40 17.25	40	18	$62.25 \\ 69.75$	46	30	130.68	54	10	56.25 61.50
34	8	21.75	40	20 22	69.75	46	32	143.74	54	12	67.50
34	10	25.50	40	24	77.25 84.75	46	34	158.11	. 54	14	74.25
34	12	30.00	40	26	92.55	46	36	173.92	54	16	83.25
34	14	36.75	40	28	101.80	48	6	36.75	54 54	18	96.75
34 34	16 18	45.00	40	30	111.98	48	8	42.00	54	20 22	108.75
34	20	51.75 57.45	40 40		123.17	48	10	48.75	54	24	$120.75 \\ 132.75$
34	22	63.75	40		135.48	48	12	54.00	54	26	144.75
34	24	69.75	10	30	149.02	48 48	14	61.50	54	28	159.22
34	26	75.00	42	4	23 25	48	16 18	$67.50 \\ 75.00$	54	30	175.14
34	28	82.50	42	6	23.25 26.25	48	20	87.00	54 54	32	192.65
34	$\frac{30}{32}$	90.75 99.82	42	8	32.25	48	22	99.00	54	$\frac{34}{36}$	$211.91 \\ 233.10$
01	04	33.84	42 42	10	37.50	48	24	111.00	01	90	455.10
36	4	15.90	42	12 14	$43.50 \\ 50.25$	48	26	123.00	56	6	54.00
36	6	19.50	42	16	57.75	48 48	28	135.30	56	8	60.75
36	8	24.00	42	18	65.62	48	$\frac{30}{32}$	$\begin{vmatrix} 148.83 \\ 163.71 \end{vmatrix}$	56	10	66.75
36 36	10	28.65	42	20	73.12	48	34	180.08	56 56	12 14	72.75
36	12 14	33.75	42	22	80.62	48	36	198.08	56	16	80.25 90.00
36	16	39.75 48.60	42 42		88.12				56		104.25
36	18	55.50	42		95.62	50	6	40.87	56		119.25
36	20	61.50	42		$05.18 \\ 15.69$	50	8	47.25	56	22	134.25
36	22	67.50	42		27.25	50	$\frac{10}{12}$	53.25	56	24	149.25
36	24	73.50	42	34 1	39.97	50	14	58.50 66.00	56 56		164.25
36 36	26 28	79.50	42	36 1	53.96	50	16	75.00	56		180.67
36	30	87.45 96.19	1.1			50	18	84.00	56		$198.73 \\ 218.60$
36		05.80	44		29.25	50	20	96.00	56		240.46
36		16.38	44		35.62 11.25	50	22	108.00	56		264.50
36					17.25	50 50		$120.00 \\ 132.00$		-	



"AMERICAN" ALL-WROUGHT STEEL SPLIT PULLEYS-CONTINUED

Dia. Ins.	Face Ins.	List	Dia. Ins.	Face Ins.	List	Dia. Ins.	Face Ins.	List	Dia. Ins.	Face Ins.	List
58	6	60.00	64	20	150.00	70	34	310.90	78	20	196.60
58	8	65.25	64	22	197 10	70	36	326.00	78	22	251.60
58	10	71.25	64	24	$197.10 \\ 210.20$	10	00	020.00	78	24	279.40
58	12	78.37	64	26	223.50	72	6	79.50	78	26	295.75
		86.62	64	28	236.85	72	8	92.15	78	28	312.35
58	14					72	10	92.15	70	20	312.30
58	16	96.37	64	30	250.40	72	10	105.05	78	30	329.25
58	18	110.62	64	32	264.05	72	12	118.15	78	32	346.40
58	20	125.62	64	34	273.85	72	14	131.30	78	34	363.80
58	22	140.62	64	36	291.75	72	16	145.40	78	36	381.45
58	24	155.62				72	18	159.65			
58	26	170.62	66	6	68.55	72	20	174.30	80	8	109.60
58	28	187.68	66	8	80.25	72 72	22	232.90	80	10	124.25
58	30	206.44	66	10	92.20	72	24	247.35	80	12	139.35
58	32	227.08	66	12	104.35	72	26	262.00	80	14	154.65
58	34	249.78	66	14	116.45	72	28	276.80	80	16	170.95
			66	16	129.35	72	30	291.90	80	18	187.45
58	36	274.75		10	149.90	70			80	20	204.40
			66	18 20	142.20	72 72	32	307.20		20	
60	6	63.75	66	20	155.30	72	34	322.75	80	22	256.70
60	8	70.50	66	22	205.55	72	36	338.50	80	24	291.08
60	10	77.25	66	24	218.95				80	26	307.00
60	12	84.00	66	26	232.50	74	8	96.35	80	28	325.20
60	14	93.00	66	28	246.15	74	10	109.65	80	30	342.65
60	16	102.75	66	30	259.95	74	12	123.20	80	32	360.35
60	18	117.00	66	32	273.85	74	14	136.85	80	34	378.35
60	20	132.00	66	34	287.95	74	16	151.50	80	36	396.60
	22	147.00	66	36	302.20	74	18	166.30	00	00	000.00
60		147.00	00	30	304.40	74	20	181.50	00	8	114.25
60	24	162.00	00	0	70 00		20	240.40	82	10	
60	26	177.00	68	6	72.20	74	22	240.40	82	10	129.45
60	28	194.70	68	8	84.15	74	24	257.70	82	12	145.10
60	30	214.17	68	10	96.35	74	26	272.90	82	14	160.95
60	32	235.58	68	12	108.75	74	28	288.30	82 82 82	16	177.90
60	34	259.13	68	14	121.10	74	30	303.95	82	18	195.05
60	36	285.04	68	16	134.25	74	32	319.80	82	20	212.65
00	00	-00.01	68	18	147.40	74	34	335.90	82	22	262.30
62	6	64.40	68	20	160.80	74	36	352.30	82	24	302.90
62	8	72.85	68	22	214.30		00	002.00	82 82 82	26	320.50
62	10	84.30	68	24	227.95	76	8	100.65	82	28	338.30
		05.05	68	26	241.70	76	10	114.30	00	30	356.50
62	12	95.95	08					128.35	82	32	
62	14	107.55	68	28	255.70	76	12	128.35	82		374.90
62	16	119.95	68	30	269.85	76	14	142.55	82	34	393.60
62 62	18	132.30	68	32	284.10	76	16	157.75	82	36	412.58
62	20	144.85	68	34	298.50	76	18	173.10			
62	22	185.80	68	36	313.05	76	20	188.95	84	8	119.00
62	24	201.65				76	22	245.30	84	10	134.78
62	26	214.70	70	6	75.80	76	24	268.35	84	12	150.95
62	28	227 80	70	8	88.10	76	26	284.10	84	14	167.40
62	30	$227.80 \\ 241.10$	70	10	100.70	76	28	300.10	84	16	184.95
04				12	113.55	76	30	316.35	84	18	202.75
62 62	32	254.50	70		126.35	76	32	332.85	84	20	221.0
62	34	268.05	70	14						20	
62	36	288.70	70	16	139.95	76	34	349.65	84	22	265.40
			70	18	153.60	76	36	366.70	84	24	315.00
64	6	65.05	70	20	167.60				84	26	333.18
64	8	76.50	70	22	223.70	78	8	105.05	84	28	351.70
64	10	88.20	70	24	237.85	78	10	119.15	84	30	370.58
64	12	100.10	70	26	252.20	78	12	133.70	84	32	389.6
64	14	111.95	70	28	266.60	78	14	148.45	84	34	409.0
64	16	124.60	70	30	281.20	78	16	164.20	84	36	428.70
		144.00	10	32	295.95	78	18	180.20	OI	.00	140.10

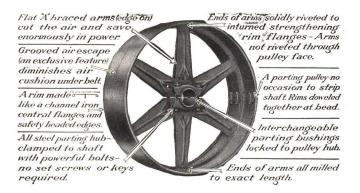


"AMERICAN" ALL-WROUGHT STEEL SPLIT PULLEYS—CONTINUED

Dia. Ins.	Face Ins.	List	Dia. Ins.	Face Ins.	List	Dia. Ins.	Face Ins.	List	Dia. Ins.	Face Ins.	List
-											
86	8	123.90	92	32	453.95	100	28	470.95	108	24	479.9
86	10	140.25	92	34	476.10	100	30	495.15	108	26	496.9
86	12	157.10	92	36	498.50	100	32	519.45	108	28	523.1
86	14	174.20	ALC: NO.	200, 50	10000	100	34	544.00	108	30	549.5
86	16	192.40	94	10	163.85	100	36	568.75	108	32	576.0
86	18	210.85	94	12	183.45	500.0			108	34	602.8
86	20	229.80	94	14	203.20	102	10	186.49	108	36	629.7
86	22	269.70	94	16	223.95	102	12	208.45	100	00	020.1
86	24	227 70	94	18	244.95	102	14	230.50	110	10	210.0
86	24 26	$327.70 \\ 346.55$	94	20	266.35	102	16	253.40	110	12	234.0
	28	965 90	94	22	288.20	102	18	276.35	110	14	258.0
86	20	365.80	94	24	200.40	102	20	299.50	110	16	283.0
86	30	385.35		26	382.15		22				
86	32	405.15	94		404.00	102		322.90	110	18	308.1
86	34	425.25	94	28	426.05	102	24	438.40	110	20	333.5
86	36	445.60	94	30	448.40	102	26	457.75	110	22	359.3
			94	32	471.00	102	28	482.30	110	24	493.8
88	8	128.90	94	34	493.85	102	30	507.00	110	26	512.0
88	10	145.85	94	36	517.00	102	32	531.80	110	28	538.7
88	12	163.35		1		102	34	556.80	110	30	565.7
88	14	181.05	96	10	170.15	102	36	582.00	110	32	592.9
88	16	199.90	96	12	190.55				110	34	620.3
88	18	218.95	96	14	210.95	104	10	191.35	110	36	637.9
88	20	238.55	96	16	232.35	104	12	213.85	110	00	001.0
88	22	274.60	96	18	253.90	104	14	236.30	112	10	216.8
88	24	340.60	96	20	275.85	104	16	259.55	112	12	241.4
00	26	360.20	96	20 22	298.25	104	18	282.75	112	14	266.1
88				04							291.7
88	28	380.00	96	24	396.90	104	20	306.20	112	16	
88	30	400.15	96	26	419.45	104	22	329.95	112	18	317.8
88	32	420.60	96	28	442.20	104	24	452.25	112	20	343.8
88	34	441.40	96	30	465.15	104	26	469.10	112	22	369.6
88	36	462.50	96	32	488.35	104	28	494.05	112	24	507.6
	1		96	34	511.90	104	30	519.15	112	26	528.0
90	10	151.70	96	36	535.70	104	32	544.35	112	28	555.4
90	12	169.85				104	34	569.75	112	30	583.1
90	14	188.20	98	10	176.60	104	36	595.25	112	32	610.9
90	16	207.65	98	12	197.85				112	34	640.6
90	18	227.30	98	14	219.10	106	10	196.95	112	36	668.8
90	20	247 45	98	16	241.20	106	12	220.00			
90	22	$247.45 \\ 279.80$	98	18	263.25	106	14	243.05	114	12	248.9
90	24	354.05	98	20	285.65	106	16	266.95	114	14	274.1
	26	374.35	98	22	308.50	106	18	290.90	114	16	300.8
90				24	410.75	106	20	315.10	114	18	326.4
90	28	394.90	98					990 50		20	352.9
90	30	415.75	98	26	435.45	106	22	339.50	114	20	379.8
90	32	436.85	98	28	459.15	106	24	466.10	114	22 24	
90	34	458.25	98	30	483.00	106	26	482.20	114		521.4
90	36	479.95	98	32	506.85	106	28	507.85	114	26	543.9
			98	34	530.95	106	30	533.70	114	28	572.0
92	10	157.75	98	36	555.25	106	32	559.60	114	30	600.2
92	12	176.55				106	34	585.80	114	32	628.6
92	14	195.70	100	10	181.50	106	36	612.10	114	34	657.2
92	16	215.85	100	12	203.20		1		114	36	685.9
92	18	236.10	100	14	224.90	108	10	203.40		1	
	20	256.85	100	16	247.45	108	12	226.90	116	12	256.
92	20	283.90	100			108	14	250.45	116	14	282.
92	22			18	269.90			274.90			309.0
92	24	368.00	100	20	292.65	108	16		116	16	
92	26	389.45	100	22	315.80	108	18	299.40	116	18	335.8
92	28	410.50	100	24	424.60	108	20	324.70	116	20	362.9
92	30	432.10	100	26	446.90	108	22	349.40	116	22	390.3

"AMERICAN" ALL-WROUGHT STEEL SPLIT PULLEYS-CONTINUED

Dia. Ins.	Face Ins.	List									
116	24	535.30	118	16	317.65	118	34	694.30	120	24	563.00
116	26	560.10	118	18	344.95	118	36	724.30	120	26	592.90
116	28	588.75	118	20	372.65				120	28	622.00
116	30	617.60	118	22	400.70	120	12	271.95	120	30	652.45
116	32	646.60	118	24	549.15	120	14	298.70	120	32	682.60
116	34	675.95	118	26	576.50	120	16	326.40	120	34	713.00
116	36	705.35	118	28	605.65	120	18	354.25	120	36	743.60
118	12	264.20	118	30	634.95	120	20	382.50			
118	14	290.50	118	32	664.50	120	22	411.20			1



A CAREFUL STUDY OF THE ABOVE DIAGRAM WILL DISCLOSE SOME OF THE PRINCIPAL POINTS OF "AMERICAN" SUPERIORITY.



LIST EXTRAS FOR BORES LARGER THAN STANDARD

For pulleys 14 inch to 24 inch diameter inclusive, up to and including 12 inch face, when made on $4\frac{7}{16}$ inch bore, add 2.92.

For pulleys 14 inch to 24 inch diameter inclusive, above 12 inch face, when made on $\frac{1}{16}$ inch bore, add 4.38.

For pulleys 25 inch to 30 inch diameter inclusive, 4 inch to 8 inch face inclusive, when made on $4\frac{7}{16}$ inch bore, add 3.65.

For pulleys 30 inch to 48 inch diameter inclusive, up to and including 16 inch face, when made on 6 inch bore, add 8.77.

For pulleys 30 inch to 48 inch diameter inclusive, with faces wider than 16 inch, when made on 6 inch bore, add 13.15.

For pulleys 36 inch to 48 inch diameter inclusive, up to and including 16 inch face, when made on 8½ inch bore, add 13.15.

For pulleys 36 inch to 48 inch diameter inclusive, with faces wider than 16 inch, when made on 8 ½ inch bore, add 17.51.

For pulleys 50 inch to 60 inch diameter inclusive, up to and including 16 inch face, when made on 6 inch bore, add 5.84.

For pulleys 50 inch to 60 inch diameter inclusive, with faces wider than 16 inch, when made on 6 inch bore, add 8.77.

For pulleys 50 inch to 60 inch diameter inclusive, up to and including 16 inch face, when made on $8\frac{1}{2}$ inch bore, add 8.77.

For pulleys 50 inch to 60 inch diameter inclusive, with faces wider than 16 inch, when made on $8\frac{1}{2}$ inch bore, add 11.70.

Pulleys 62 inch diameter and above, are made on 6 inch or $8\frac{1}{2}$ inch bore without extra charge.

LIST EXTRAS FOR KEYSEATING

For keyseating 3 inch, 4 inch and 5 inch pulleys, add 30c each.

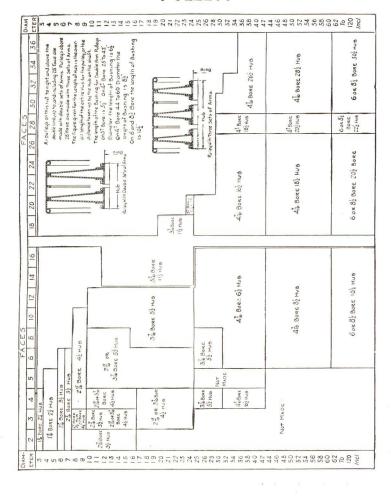
For keyseating standard pulleys 6 inch diameter to 24 inch diameter inclusive, with facts to 12 inch wide inclusive, add 75c each; for standard pulleys 6 inch diameter to 24 inch diameter inclusive, with faces wider than 12 inch, add 1.50 each.

For keyseating standard pulleys above 24 inch diameter with faces to 16 inch wide inclusive, add 75c each; for standard pulleys above 24 inch diameter with faces wider than 16 inch to 28 inch wide inclusive, add 1.50 each; for standard pulleys above 24 inch diameter with faces wider than 28 inch, add 2.25 each.

For larger bores not listed, prices on application.



"AMERICAN" ALL-WROUGHT STEEL SPLIT PULLEYS



ROBERTS' PATENT SELF-OILING LOOSE BUSHINGS



PLATE 7932

Standard Outside Diameter of Bushing Corresponding to Bores of Pulleys Inches	Inside Bores of Bushings Inches	Length of Bushing Without Oil Chamber Inches	For Pulley Face as given in this Column Inches	Price
$1\frac{3}{16}$	$\frac{1}{2}$ $\frac{13}{16}$	2 ½ 2 ½†	2 3—4	$\frac{1.75}{2.00}$
4—5 Dia. Pulley	$\frac{11}{16}$ $\frac{7}{16}$	$\begin{array}{c} 2\frac{9}{16} \\ 3\frac{9}{16} \\ 3\frac{9}{16} \\ \end{array}$	2 3 4—5	2.00 2.25 2.50
$2rac{7}{16}$	1—1 15/16	$\begin{array}{c} 3\frac{7}{8} \\ 4\frac{9}{16} \\ 4\frac{9}{16} * \\ 4\frac{9}{16} * \end{array}$	3 4 5 6	2.75 3.10 3.40 3.40
2 15	$1-2\frac{3}{16}$	4 78 5 78 6 78 6 78*	4 5 6 8—10	3.10 3.65 5.10 6.00
3 76	$1\frac{3}{16}$ $2\frac{11}{16}$	4 7/8 5 7/8 6 7/8 8 7/8 8 7/8 8 7/8 8 7/8	4 5 6 8 10 12	3.60 4.75 5.90 6.70 8.30 8.30
4 7 16	$1\frac{11}{16}$ $-3\frac{7}{16}$	7 ½8 9 ½8 9 ½8 9 ½8* 9 ½8*	6 8 10 12	6.80 8.50 9.60 9.60

In sizes marked with * Collars are supplied to go between tight and loose pulleys. †Special Collar $\frac{1}{2}$ inch wide.



SPLIT LOOSE BUSHINGS

WITH FAUL'S POSITIVE LUBRICATOR FOR LOOSE PULLEYS

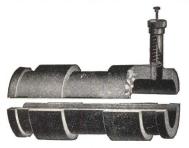


PLATE 7933 In ordering specify whether Solid or Split Bushings are desired. Sample lubricator candles are supplied with each Bushing.

Standard Outside Diameter of Bushing Corresponding to Bores of Pulleys Inches	Inside Bores of Bushings Inches	Length of Bushing Without Oil Chamber Inches	For Pulley Face as given in this Column Inches	Price
1 3 **	1/2-13	3 3/8 3 3/8†	3—4	1.50 1.75
1 15** 4—5 Dia. Pulley	$\frac{11}{16}$ — $1\frac{7}{16}$	3 3/8 4 3/8 4 3/8†	2 3 4—5	$1.75 \\ 2.00 \\ 2.25$
$2\frac{7}{16}$	1—1 13 16	$\begin{array}{c} 4 \ \frac{11}{16} \\ 5 \ \frac{5}{5} \ \frac{7}{8} \\ 5 \ \frac{7}{16} * \\ 6 \ \frac{9}{16} * \end{array}$	3 4 5 6	$2.45 \\ 2.75 \\ 3.00 \\ 4.00$
$2^{\frac{15}{16}}$	$1-2\frac{3}{16}$	$\begin{array}{c} 5\frac{3}{4}\\ 7\frac{1}{16}\\ 6\frac{7}{8}*\\ 8\frac{1}{2}* \end{array}$	4 5 6 8	2.75 3.25 4.50 5.30
$3\frac{7}{16}$	$1\frac{3}{16}$ — $2\frac{11}{16}$	$\begin{array}{c} 5{}^{3}4\\ 7{}^{1}_{16}\\ 6{}^{1}/8*\\ 8{}^{1}/2*\\ 10{}^{1}/4* \end{array}$	4 5 6 8 10—12	3.20 4.20 5.20 5.90 7.35
4 7 6	$1\frac{11}{16}$ $-3\frac{7}{16}$	8 ½ 8 ½ 11 ½	6 8 10—12 14—16	6.00 7.50 8.50

In sizes marked with * Collars are supplied to go between tight and loose pulleys. †Special Collar ½ inch wide. **No Lubricator supplied for these sizes—Oil Hole provided in Loose Bushings.

Prices of Lubricators, Net—¼ inch pipe thread, 55c each; ¾ inch pipe thread, 65c each; ½ inch pipe thread, 80c each.
Prices of Lubricator Candles in wooden boxes of 100.—¼inch diameter, 2.35; ½ inch diameter, 2.85; ¾ inch diameter, 3.55.



GILBERT WOOD SPLIT PULLEYS



PLATE 7934

STYLE C STOCK PULLEY

Made in sizes from 3 to 14 inches in diameter.

Our Style C Pulley is regarded almost universally as incomparably superior to any similar article manufactured.



PLATE 7935



PLATE 7936

STYLE B STOCK PULLEY

Pulleys from 12 inches to 24 inches in diameter, inclusive, are constructed with four sets of spokes.

Pulleys from 25 inches to 70 inches in diameter, inclusive, are constructed with six sets of spokes.

Pulleys larger than 72 inches in diameter have eight sets of spokes.

For prices see Standard Wood Pulley List.

GILBERT WOOD SPLIT PULLEYS



PLATE 7937 SPOKE AND RIM FASTENING



PLATE 7938 BUSHINGS

SPOKE AND RIM FASTENING

It will be observed that method of recessing rim to receive the spoke does not cut a sharp angle out of the rim, extending close to the outer edge and rendering it liable to fracture under severe shocks, as is the case with the form of dove tailed ordinarily used.

BUSHINGS

Made in halves exclusively from selected hard maple, thoroughly air seasoned and kiln dried, turned on the outside and bored to exact size.



PLATE 7939 STEP CONE



PLATE 7940 FLANGE PULLEY



PLATE 7941 TAPER CONE

STEP CONE

We make Step Cone Pulleys to order in either Style C or Style B. To find price, consider each step as a separate pulley. Take list for standard pulleys, and add 50%.

FLANGE PULLEY

We make Flange Pulleys in either Style B or Style C with one, two or more flanges as ordered.

To find price, add to regular list 20% for single flange, 25% for double flange and 30% for triple flange, crating included.

TAPER CONE

We make Taper Cone Pulleys to order in either Style C or Style B.

To find price, use list for largest diameter and full width of face, and add 25% to make total list.

GILBERT WOOD SPLIT PULLEYS



PLATE 7942 MOTOR PULLEY



PLATE 7943 STYLE D

MOTOR PULLEY

Made from 2 to 11 inches in diameter inclusive. Built for lasting efficient service. Can be rebored or face turned down to meet different specifications.

STYLE D

Made from 12 inch diameter up. Has solid web and iron center and is especially adapted for running dynamos and trip hammers, or for other extremely severe work.



PLATE 7944 STYLE A

This is especially adapted for main driving pulley, and for other extremely severe work. Built up to $20~{
m feet}$ diameter.

For all Pulleys on this page, see Special List.

SHEET METAL SUPPLY CO HINGS LANCASTER, PENNA

WOOD SPLIT PULLEYS

	22 24	16.90 19.30 20.50 22.10
	50	111.14.15.25.25.25.25.25.25.25.25.25.25.25.25.25
	18	2011 2011 2012 2012 2012 2012 2012 2012
	16	28.20.00 11.20.00 20.20.00 11.20.00 20.20.00 11.20.00 20.20.20.20.20.20.20.20.20.20.20.20.20.2
	14	6.05 6.05
OF FACE	12	4.4.4.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0
WIDTH	10	44.10 44.10 5.25 6.10 6.10 6.10 6.10 6.10 6.10 6.10 6.10
F	∞	83.77 8.88.77 8.88.89 8.88.99 8.88.89 8.89 8.99 8.
	9	88888888888888888888888888888888888888
	ŭ	8.88.88.88.44.44.44.10.25.88.88.39.40.30.10.25.88.88.89.49.40.10.25.80.80.80.25.11.11.12.20.20.20.20.20.20.20.20.20.20.20.20.20
	4	2.29 3.300 3.300 3.300 3.325 3.325 5.500 5
	က	01999999999999999999999999999999999999
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WOOD SPLIT PULLEYS-CONTINUED

			M	WIDTH OF	F FACE						
4	10	9	∞	10	12	14	16	18	20	55	24
		20.90	26.30	31.70	37.10	42.50	47.90	53.30	58.70	64.10	69.50
		22.30	28.10	33.90	39.70	45.50	51.30	57.10	62.90	68.70	74.50
		23.80	30.00	36.20	42.40	48.60	54.80	61.00	67.20	73.40	79.60
 		25.40	32.00	38.60	45.20	51.80	58.40	65.00	71.60	78.20	84.80
		27.10	34.10	41.10	48.10	55.10	62.10	69.10	76.10	83.10	90.10
	:	28.90	36.30	43.70	51.10	58.50	65.90	73.30	80.70	88.10	95.50
 		30.80	38.60	46.40	54.20	62.00	08.69	27.60	85.40	93.20	101.00
		32.80	41.00	49.20	57.40	65.60	73.80	82.00	90.20	98.40	106.60
		34.90	43.50	52.10	60.70	69.30	77.90	86.50	95.10	103.70	112,30
		37.10	46.10	55.10	64.10	73.10	82.10	91.10	100.10	109.10	118.10
		39.40	48.80	58.20	67.60	77.00	86.40	95.80	105.20	114.60	124.00
		41.90	51.80	61.70	71.60	81.50	91 40	101.30	111.20	121,10	131.00
		44.50	54.90	65.30	75.70	86.10	96.50	106.90	117.30	127.70	138.10
 	:	47.20	58.10	69.00	79.90	08.06	101.70	112.60	123.50	134.40	145.30
 		50.00	61.40	72.80	84.20	95.00	107.00	118.40	129.80	141.20	152.60
			71.90	84.80	97.70	110,60	123.50	136.40	149.30	162.20	175.10
			83.30	97.70	112.10	126.50	140.90	155.30	169.70	184.10	198.50
 			95.60	111.50	127.40	143.30	159.20	175.10	191.00	206.90	222.80
			109 00	126.50	144 00	161.50	179.00	196.50	214.00	231.50	249.00
			123.70	143.00	162.30	181.60	200.90	220.20	239.50	258.80	278.10
			139.30	160.40	181.50	202.60	223.70	244.80	265.90	287.00	308 10
			155.00	178.70	901.60	994 50	247 40	970.30	993.90	316.10	339 00
			00.00	01.0	00.401		0.7.	0000	01:001	04.04.0	0000

Pulleys not listed take next higher price.

We send Crown Face Pulleys unless otherwise specified.

CAST IRON PULLEYS



PLATE 7945 SOLID



PLATE 7946 SPLIT

When ordering pulleys, state whether for single or double belt; unless otherwise specified single belt pulleys will be furnished as far as listed. If a greater horse-power than a double leather belt is required, specify the horse-power, revolutions per minute and service required. Also specify whether solid, split, clamp hub, T and L, flange or special; if no description is given, plain solid pulleys will be furnished. If special pulleys are required, send sketch showing details of special features.

Specify diameter in inches. This should be the first dimension given. If exact diameter is required, so state in order and whether the measurement shall be made at crown or edge of rim. An extra charge is made for exact diameter.

The face should be specified in inches. This should be the second dimension given and should be understood as the width of belt to be used. If an exact width of face is desired it should be stated on order, the word exact following dimensions of face. An extra charge is made for making face exact.

Pulleys are made with faces of sufficient width to carry belts of the nominal widths specified, and if ordered to have faces more than one-half inch wider than size listed the charge will be at the next wider list.

Specify exact diameter of shaft in inches. This should be the third dimension given. If shaft is odd or special diameter, make a gauge to accompany order. Do not order pulleys to be bored " $1\frac{15}{16}$ inches scant," " $2\frac{7}{16}$ inches full," or "about $\frac{1}{64}$ inch under 3 inches."

Specify whether with crown or straight face; if neither is specified, crown face pulleys will be furnished. Pulleys for belts which do not shift should have crown face, pulleys for shifting belts should have straight face. Each pair of tight and loose pulleys should have crown face.

State whether keyseated or set screwed or both; if neither is specified, set screws only will be furnished; if keyseated, specify whether straight or taper. Pulleys keyseated and not set screwed should have taper keyseat. Taper keyseats will be cut Y_8 inch taper per foot unless otherwise ordered. If size of keyseat is not specified the standard will be used. For split hub pulleys, straight keyseat with set screw on top is recommended. An extra charge will be made for pulleys both keyseated and set screwed, or having more than two setscrews.



SOLID AND SPLIT IRON PULLEYS Machine Moulded, Bored, Turned, and Balanced, with Set Screws or Key Seats

= -	SOLID						SPLIT			SOLI					
Diam Inch	Face Inch	S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt	S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt	Diam Inch			D'ble Belt	D'ble Arm D'ble Belt	S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt
Largest Bore 1 18 "9	3 4 5 6 7 8 9 10 11 12 3	2.20 2.50 2.85 3.20 3.60 4.05	2.80 3.15 3.60 4.10 4.55 5.05 5.55 6.05 6.55		4.60 4.95 5.60 6.05	4.30 4.90 5.35 6.10 6.55 7.35 7.85 8.65 9.15		est Bore eg. Price	10 11 12	3.30 3.75 4.20 4.70 5.25 5.85	4.25 4.80 5.40 6.00 6.65 7.30 8.00 8.75 9.55		6.75 7.65 8.25	5.95 6.85 7.65 8.40 9.05 10.10 10.80 11.95 12.75	
Largest Bore 1 15 " Lat Reg. Price 1 15 " L	4 5 6 7 8 9 10 11 12	2.75 3.10 3.50 3.95 4.40	3.50 3.95 4.40 4.90 5.35 6.35 6.85		4.85 5.25 5.95 6.40	5.25 5.70 6.40 6.90 7.65 8.15 8.95 9.50		Bore Price	11	3.60 4.05 4.55 5.10 5.70 6.30	4.55 5.15 5.80 6.45 7.15 7.85 8.60 9.35		8.90	6.40 7.35 8.00 9.05 9.75 10.90 11.65 12.85	
Largest Bore 115_{16} " ∞ at Reg. Price 115_{16} " ∞	3 4 5 6 7 8 9 10 11 12 13	2.65 3.00 3.40 3.80 4.25 4.75	3.35 3.80 4.25 4.75 5.25 5.80 6.35 6.95 7.60		4.60 5.30 5.70 6.45	6.15 6.95 7.45 8.35 8.90 9.85 10.50		13	12 13 14 15 3 4 5 6 7 8	3.65 4.35 4.90 5.50 6.10 6.75	10.95 11.75 12.60 4.20 4.85 5.50 6.20 6.90			14.95 15.75 17.10 6.00 6.65 7.70 8.40 9.50 10.25	
Largest Bore 115," o	3 4 5 6 7 8 9 10 11 12	2.90 3.25 3.65 4.10 4.60 5.10	3.65 4.15 4.65 5.20 5.75 6.30 6.90 7.50		4.85 5.55 6.00 6.80 7.30	5.25 6.05 6.55 7.40 7.95 8.85 9.45		Largest Bore at Reg. Price	9 10 11 12 13 14 15	4.05	8.40 9.20 10.00 10.83 11.70 12.60 13.50		10.50	11.45 12.25 13.50 14.35 15.70 16.60 18.00	
Largest Bore 27/6" Lar at Reg. Price 27/6" U at 1	3 4	3.10 3.50 3.98 4.40 4.90 5.48	8.88 0 3.44 0 3.93 5 4.44 5.00 5.53 6.13 6.80 7.50 8.20 8.20	5	5.20 6.00 6.45 7.30	5.18 5.68 6.50 7.08 7.98 8.58 9.60 10.30 11.40 12.18		Largest Bore 27/8" T	4 5 6 7 8 9 10 11 12	4.65 5.10 5.75 6.45 7.20 7.95	5.20 5.93 6.70 7.50 8.30 9.10 9.93 10.80 11.70 12.60 13.50		8.18 9.30 9.95 11.30	8.35 9.10 10.35 11.15 12.45 13.30 14.65 15.55 17.00 17.90	



SOLID AND SPLIT IRON PULLEYS-CONTINUED

SOLID					SPLIT I				SOLID				CONTINUED		
-		SOLI	ט	D'ble		orliT	D'ble	-	1	SOLI	ע	D'ble		SPLIT	
Diam Inch	Face Inch	S'gle Belt	D'ble Belt	Arm D'ble Belt	S'gle Belt	D'ble Belt	Arm D'ble Belt	Diam Inch			D'ble Belt	Arm D'ble Belt	S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt
15	3 4 5 6	4.35 4.85 5.65 6.10	4.80 5.55 6.35 7.15		6.30 6.80 8.05 8.50	6.75 7.50 8.75 9.55		18	15 16 17		18.25 19.45 20.70			24.10 25.30 27.25	
27/6"	7 8 9	6.85 7.70 8.60	8.00 8.85 9.75		9.70 10.55	10.85 11.70 13.10		19	3 4 5	5.45 6.25 7.05	6.05 7.05 8.10		7.70 8.50 9.85	8.30 9.30 10.95	
Bore Price	10 11 12		10.65 11.60 12.55			14.00 15.45 16.40		15/16	6 7 8	7.90 8.85 9.85	9.15 10.25 11.35		10.70 12.20 13.20	11.95 13.60	
Largest Bore at Reg. Price	13 14 15		13.50 14.50 15.50			17.90 18.90	X 2 2 2 2 2	Bore 2	9	10.95	$12.40 \\ 13.55$		14.90	14.70 16.35 17.50 19.25	
16	3 4	4.65 5.20	5.10		6.75 7.30	7.20 7.90		Largest B at Reg. P	12 13		$\frac{15.90}{17.10}$		0.0000000000000000000000000000000000000	20.45 22.30 23.55	
215/16"	5 6 7	5.80 6.50 7.30	$6.60 \\ 7.45$		8.40 9.10 10.40	9.20 10.05 11.60		Lar	15		19.60 20.90 22.20			25.45 26.75 28.75	
e 215	8 9 10	8.20 9.20	$\frac{9.20}{10.10}$		$11.30 \\ 12.85$	12.30 13.75 14.70			18 19		23 55			30.10 32.15	
Largest Bore at Reg. Price	11 12 13		12.00 13.00 14.00			$16.20 \\ 17.20 \\ 18.20$		20	3 4 5	5.75 6.65 7.55	6.40 7.45 8.55		8.20 9.10 10.60		
at R	14 15 16		$15.00 \\ 16.05 \\ 17.20$			19.80 21.45 22.65			6 7 8	8.50 9.45 10.45	9.65 10.80 11.95		11.55 13.10 14.10	12.70 14.45	
17	17	4.90	18.20 5.40		7.00	24.25 7.50		215/16	9 10 11	11.55 12.70	15.60		15.85 17.00	17.45	
	4 5 6	5.50 6.25 7.00	6.25 7.10 8.00		7.60 8.85 9.60	8.35 9.70 10.60		Bore Price	12 13 14		18.15 19.45			21.80 23.80 25.10	
215/1	7 8 9	7.85 8.75 9.75	8.90 9.85 10.80		11.95 13.40	12.00 12.95 14.45		Largest l at Reg.	15 16 17		23.55			27.15 28.50 30.65	
Largest Bore at Reg. Price 215/6"	10 11 12		11.80 12.80 13.85			15.50 17.00 18.05			18 19 20		26.40	31.60		32.05 34.25	39.45
Larges at Reg	10		14.90 16.00 17.10 18.25			18.70 20.80 22.50 23.65						34.35 37.15 40.00 42.90			43.00 46.60 50.30
18	17	5.20	19.40		7.45	25.45 7.95		21	3 4	6.05 7.00	6.75 7.85	42.50	8.50 9.45	9.20 10.30	54.05
215/16"	4 5 6 7	5.85 6.60 7.40 8.30	6.65 7.60 8.55		8.05 9.40 10.20 11.70	8.90 10.40 11.35 12.90		1/91/	5 6 7 8	8.00 9.00 10.00	9.00 10.15 11.35		$11.05 \\ 12.05 \\ 13.65$	12.05 13.20 15.00	
ore rice 2	8 9 10	9.30 10.40	$10.55 \\ 11.60$		$12.65 \\ 14.35$	13.90 15.55 16.60		Bore 3	9	11.00 12.10 13.25	13.80 15.05		14.65 16.40 17.55	16.20 18.10 19.35 21.30	
Reg. I			13.75 14.85 15.90			$\frac{18.30}{19.40}$		rgest B. Reg. P	12 13 14	*****	17.65 19.00 20.35			$22.60 \\ 24.65$	
at Reg. Price	12		$14.85 \\ 15.90$			18.30 19.40 21.10 22.25		Largest I at Reg.	13		19.00 20.35				



SOLID AND SPLIT IRON PULLEYS-CONTINUED

		SOLL	D		SPLIT					SOLID			SPLIT		
Diam Inch	Face Inch	S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt	S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt	Diam Inch			D'ble Belt	D'ble Arm D'ble Belt	S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt
21	16 17 18		23.15 24.60 26.05			29.50 31.70 33.15		23	28. 30			50.00 53.35			61.9 66.2
at Reg. Price 3 7/6"	18 19 20 22 24 26 28		27.55	33.10 39.95 38.85 41.90 44.90		35.40	40.95 44.60 48.30 42.20	24	3 4 5 6 7 8 9	7.05 8.20 9.35 10.50 11.65 12.80 14.00 15.20	9.25 10.60 12.00 13.40 14.85 16.30		9.85 11.00 12.90 14.05 15.90 17.05 19.00 20.20	14.15 15.55 17.65 19.10 21.30	
22	3 4 5 6 7 8	6.35 7.40 8.45 9.50 10.55 11.55	7.10 8.30 9.50 10.75 12.00 13.30		9.00 10.05 11.75 12.80 14.50 15.50	10.95 12.80 14.05 15.95		Largest Bore 3 at Reg. Price 3	11 12	10.20	19.30 20.85 22.40			25.05 26.60 28.95 30.55 32.95 34.60	
Largest Bore at Reg. Price $37_{16}''$	9 10 11 12 13 14 15 16 17 18 19	11.55 12.65 13.85	13.30 14.60 15.95 17.30 18.70 20.10 21.55 23.00 24.50 26.00 27.55 29.10		17.30	19.25		Lar at 1	10 17 18 19 20 21 22 24 26 28 30		28.90 30.60 32.30 34.05 35.80	39.20		37.10 38.80 41.35 43.10 45.75	48.3
Large at Re	20 21 22 24 26 28 30	2 402 402 4 2 403 403 4 2 403 403 4 2 403 403 4 3 403 403 4	30.70 32.35	35.10 38.05		39.15 41.65	43.40 47.35 51.30 55.30 59.35	25	3 4 5 6 7 8 9 10	7.40 8.60 9.80 11.00 12.20 13.40 14.65 15.90	9.75 11.20 12.65 14.15 15.65 17.20 18.75			12.55 14.75 16.20 18.40 19.90 22.20 23.75	
23	3 4 5 6 7 8	6.70 7.80 8.90 10.00 11.10 12.15	8.75 10.05 11.35 12.70 14.05		9.35 10.45 12.20 13.30 15.05 16.10	11.40 13.35 14.65 16.65 18.00) 	rgest Bore 3	11 12 13 14 15 16 17 18		21.95 23.60 25.25 26.95			31.80 34.30 36.00 38.60	
Largest Bore 3 716" at Reg. Price 3 716"	9 10 11 12 13 14 15 16 17	13.30	16.85 18.30 19.75 21.25 22.75 24.30 25.85 27.45			21.50 23.65 25.10 27.35 28.85 31.15 32.70 35.10	5		18 19 20 21 22 24 26 28 30		33.95 35.75 37.60 39.45	41.25		43.00 44.80 47.55 49.40	50. 50. 54. 59. 63.
a	18 19 20 21 22 24 26			37.10 40.25 43.45		39.15 40.80 43.35	49.55 53.60		3 4 5 6 7 8	7.75 9.00 10.25 11.50 12.75 14.05	10.30 11.80 13.35 14.90		12.00 14.10 15.35 17.35	15.65 17.20	



SOLID AND SPLIT IRON PULLEYS—CONTINUED

		SOLI	D	Ĭ		SPLIT	1	1		SOLI	D		II .	SPLIT	
Diam Inch	Face Inch	S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt	S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt	Diam Inch		S'gle	D'ble Belt	D'ble Arm D'ble Belt	S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt
Largest Bore 376" 5	9 10 11 12 13 14 15 16 17 18 19 20	15.35 16.70	19.75 21.40 23.10 24.80 26.55 28.30 30.10 31.90 33.75 35.60		20.75 22.10	23.50 25.15 27.60 29.30 31.85 33.60 36.20 38.00 40.70 42.55 45.30 47.20		Largest Bore 37/6" 8	18 19 20 21 22 24 26 28 30 32			47.95 51.90 56.00			58.20 63.25 68.35 73.45 78.70 84.00 89.35
	21 22 24 26 28 30		39.40 41.35	47.10 50.80 54.55 58.35 62.20		50.05 52.00	57.75 62.40 67.15 71.95 76.85	29 29	3 4 5 6 7 8 9	9.00 10.50 12.00 13.45 14.90 16.35 17.95	12.00 13.75 15.50 17.30 19.10 20.95		12.25 13.75 16.15 17.60 19.85 21.30 24.75	17.90 19.65 22.25 24.05 26.75	
27	3 4 5 6 7	8.15 9.50 10.80 12.10 13.45	10.85 12.45 14.05		11.15 12.50 14.65 15.95 18.05	$16.30 \\ 17.90 \\ 20.30$		37/6"	10 11 12 13 14	19.45 21.05	24.70 26.60 28.55 30.50				
Largest Bore 37/6" at Reg. Price 37/6"	15 16 17 18 19 20 21 22	14.80 16.20 17.65 19.15	19.05 20.75 22.50 24.25 26.05 27.85 29.70 31.55 33.45 35.35 37.30 39.25 41.25	45.65	25.35	28.70 30.45 33.10 34.90 37.60 39.45 42.25 44.15 47.00 48.95 51.90 53.90	55.35	Largest Bore at Reg. Price	17 18 19 20 21 22 23 24 26 28 30 32		34.50 36.55 38.60 40.70 42.80 44.95 47.10 49.30	50.15 54.35 58.50 62.80 67.10 71.45 75.85		42.95 45.95 48.00 51.05 53.15 56.30 58.45 61.65	60.50 65.70 70.85 76.20 81.55 87.00 91.50
20				53.35 57.30 61.20 65.20			64.95 69.90 74.80 79.85	30	3 4 5 6 7	9.40 10.90 12.45 14.00 15.85	$14.45 \\ 16.30$		12.90 14.40 16.90 18.45 21.15		
Largest Bore 376" 8	13 14 15 16	8.55 9.95 11.35 12.75 14.15 15.55 17.00 18.50 20.10	13.10 14.80 16.50 18.25 20.00 21.80 23.60 25.45 27.80 29.20 31.10 33.05			18.95 21.45 23.20 25.80 27.60 30.25 32.10 35.35 36.75 39.55 41.50		Largest Bore 37,6" at Reg. Price 37,6"	8 9 10 11 12 13 14 15 16 17 18 19 20 21	17.15 18.75 20.35 22.00	20.05 21.95 23.90 25.85 27.85 29.85 31.90 33.95 36.00 38.10 40.25 42.40 44.60		22.45 24.95 26.55 29.10	25.35 28.15 30.10 32.95 34.95 37.90 39.95 42.95 45.00 48.10 50.25 53.40	63.60



SOLID	AND	SPLIT	IRON	PULLEYS-CONTINUED

SOLID SPLIT							1	SOLID SPLIT							
Diam Inch	Face Inch	S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt	S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt	Diam Inch			D'ble Belt	D'ble Arm D'ble Belt	S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt
30	24 26 28 30			61.25 65.65 70.15 74.70			79.85 85.45 91.15	32	28 30 32 34 3 4 5	10.80 12.40 14.10	12.50 14.50		14.60 16.20 18.90	16.30 18.30 21.35	104.8
31	3 4 5 6 7	9.85 11.40 12.95 14.55 16.15	13.25 15.15 17.05 19.00		19.00 21.45	16.75 19.60 21.50 24.30		33	6 7 8 9 10 11	15.85 17.65 19.45 21.30 23.15 25.05	18.60 20.70 22.80 24.95 27.10		20.65 23.25 26.10 27.95 29.80 32.65	26.30 29.45 31.60 33.75	
Largest Bore 315/" at Reg. Price 315/"	8 9 10 11 12 13 14 15 16 17	17.80 19.50 21.25 23.00	22.95 24.95 27.00 29.05 31.15 33.25 35.40 37.55		25.70 27.45 30.10	29.15 31.15 34.10 36.15 39.20		rgest Bore 315/"	12 13 14 15 16 17 18 19 20		31.55 33.80 36.10 38.40 40.75 43.10 45.50 47.90 50.35	59.60		39.20 42.40 44.70 48.00 50.35 53.75 56.15 59.60 62.05	71.3
Lar at ¹	18 19 20 21 22 23 24 26 28 30		41.9. 44.20 46.4. 48.7. 51.10 53.4	5 54.90 5 59.40 6 68.50 73.10 77.80		55.20 57.4 60.80 63.1 66.5	5 65.90 5 71.45 5 77.00 82.75 88.45 94.30		21 22 23 24 26 28 30 32 34		57.80	64.45 69.40 74.35 79.40 84.45 89.55 94.70		68.10 71.70 74.25	83.3 89. 95. 101. 108. 114.
32	5	10.3 11.9 13.5 15.2	0 13.9 5 15.8 0 17.8	5 5 5	14.1 15.7 18.3 20.0	$ \begin{array}{c cccc} 0 & 17.7 \\ 5 & 20.6 \\ 0 & 22.6 \end{array} $. 106.20	34	3 4 5 6 7 8 9	11.35 12.95 14.70 16.50 18.40 20.30 22.20 24.15	15.20 17.30 19.45 21.60 23.80 26.00)) 5	17.03 19.83 21.63 24.50 26.40 29.30 31.23	5 19.30 5 22.45 5 24.60 0 27.70 0 29.90 0 33.15 5 35.40	
Bore 315/8"	7 8 9 10 11 12 13 14	16.9 18.6 20.3 22.1 24.0	0 21.9 5 23.9 5 26.0 0 28.1 . 30.3 . 32.5 . 34.7	0 5 5 5 0 	24.3 27.0 28.8 31.6	0 27.6 0 30.6 0 32.7 0 35.7 . 37.9 . 41.1 . 43.3	0	Bore 315/"	11 12 13 14 15 16 17	26.10	0 30.6 32.9 35.2 37.6 40.0 42.4 44.8	0	34.20	41.00 44.40 46.73 50.20 52.60 56.14 59.60	5
Largest Bore at Reg. Price	15 16 17 18 19 20 21 22 23 24		39.2 41.3 43.8 46.1 48.8 50.9 53.8	50	0	48.8 52.1 54.4 57.8 60.2 63.7	50	Larges	19 20 21 22 23 24 26 28		49.8 52.3 54.8 57.4 60.0	0	0	62.29 64.79 68.4 70.9 74.7	0



		SOLI	D			SPLIT	,			SOLI	1)		II.	SPLIT	1
D:	T)			D'ble	(1)		D'ble			1	1	D'ble	-	orli i	D'ble
Diam Inch			D'ble Belt	Arm D'ble Belt	S'gle Belt	D'ble Belt	Arm D'ble Belt	Diam Inch			D'ble Belt	Arm D'ble Belt	S'gle Belt	D'ble Belt	Arm D'ble Belt
34	34 36			98.45 103.85			119.35 126.05	36	34 36			$106.50 \\ 112.30$			128.45 135.60
Largest Bore 315/11 5	17 18 19 20 21 22 23 24 26 28 30	11.85 13.50 17.15 19.10 23.10 25.15 27.20		65.00 70.20 75.45 80.75 86.15	35.30	20.00 23.25 25.50 28.70 31.00 34.30 36.65 40.00 42.40 45.85 48.30 54.30 54.30 56.70 70.50 77.00 79.70	77.40 83.75 90.15 96.65 103.25 109.90 116.60 123.40	Largest Bore 315/" 5.	15 16 17 18 19 20 21 22 23 24 26 28 30 32 34 36	14.90 16.90 16.90 23.10 23.10 23.10 27.30 29.45 31.65	19.65 22.05 24.50 26.95 29.45 31.95 34.50 37.05 39.65 42.25 44.90 47.55 50.25 55.70 58.45 61.25 64.10 66.95 69.85	70.30 75.90 81.50 87.25 92.95 98.70 104.50 110.35 116.30		25. 15 27. 55 31. 00 33. 45 37. 00 39. 50 44. 31 45. 65 49. 35 55. 70 48. 35 62. 20 64. 85 68. 80 71. 55 77. 55 82. 45 82. 45 85. 35	
36	3 4 5	12.40 14.20 16.05	14.30 16.55 18.85		16.80 18.60 21.55	18.70 20.95 24.40		38	4 5 6 7	17.70 19.80 21.95	20.50 23.00 25.55		23.65 25.70 28.90	$26.45 \\ 28.90 \\ 32.50$	· · · · · · · · · · · · · · · · · · ·
Largest Bore 345/n at Reg. Price 345/16	6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 22 23 24 26 28	18.00 20.05 22.10 24.15 26.20 28.30 30.45	21.15 23.50 25.85 28.25 30.70 33.15 35.65 40.70 43.25 45.85 51.10 53.75 56.45 59.15 61.90 64.65 67.40	67.55 72.95 78.45 83.95 89.55	23.50 26.55 28.60 31.70 33.75 36.90 39.05	26.65 30.00 32.35 35.80 38.25 41.75 44.25 50.40 54.05 56.65 60.40 63.05 66.85 69.55 76.20 80.15 82.90		Largest Bore 345/6" at Reg. Price 345/6"	14 15 16 17 18 19 20 21 22 23 24 26 28 30 32 34	24.10 26.25 28.40 30.60 32.85	35.95 38.60 41.30 44.00 46.75 49.50 55.10 55.10 60.80 63.65 69.45 72.35	73.25 79.10 84.90 90.85 96.80 102.80 108.85		60.95 64.95 67.75 70.80 74.65 78.75 81.65 85.80 88.70	87.05 94.20 101.25 108.50 115.75 123.10 130.50 138.00



		SOLI	D			SPLIT				SOLI	D			SPLIT	
Diam Inch		S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt	S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt	Diam Inch		S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt	S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt
Largest Bore 315/" 6	16 17 18 19 20 21 22 23 24 26 28 30 32 34		23 85 26 40 29 00 31 60 34 25 36 80 42 30 45 05 50 60 53 40 62 00 64 90 67 85 70 80 73 80	75.35 80.95 87.10 93.05 99.10 105.20 111.35	43.05	39.65 42.30 45.95 48.75 52.60 55.35 59.25 66.05 68.90 72.95 75.85 80.00 82.95 87.15 90.15	89. 20 96.05 110. 70 118. 05 125. 50 133. 00 140. 60 148. 25	55	15 16 17 18 19 20 21 22 23 24 26 28 30 32 34		23, 00 25, 65 28, 40 31, 15 33, 90 36, 65 39, 45 42, 25 45, 05 47, 85 50, 70 53, 55 56, 40 59, 25 62, 15 65, 05 67, 95 70, 90 73, 85 76, 80	80.65 86.80 92.95	43.30 45.70	38.55 42.45 45.20 49.15 51.95 55.95 62.80 65.65 69.75 72.60 78.75 79.65 83.85 86.80 91.05 94.00	95.25 102.70 110.15 117.65 125.15 132.70 140.35 148.10 155.90
Largest Bore $3 \frac{1}{15}$, A at Reg. Price $3 \frac{1}{15}$, B	16 17 18 19 20 21 22 23 24 26 28 30 32 34	16.75 18.95 21.15 23.40 28.00 30.30 32.60 34.95	22.15 24.80 27.45 30.10 32.80 35.50 40.95 43.70 46.45 52.05 54.90 57.75 60.60 63.60 69.35 72.30 75.35	78.10 84.05 90.10 96.15 102.20 108.30 114.45 120.65	44.65	28. 45 31.10 34.85 37.50 41.35 44.05 54.60 57.35 61.35 64.15 68.25 71.10 75.20 78.10 82.30 85.25 89.50 92.55	92.70 99.95 107.30 114.70 122.10 129.60 137.15 144.80 152.50	Largest Bor at Reg. Pri	15 16 17 18 19 20 21 22 23 24 26 28 30 32 34 36 38		23 85 26 65 29 45 32 25 35 10 37 95 40 80 49 50 52 45 55 40 58 35 61 35 67 35 70 30 79 40	83.50	47.35	30.55 33.35 37.30 40.10 44.15 47.00 51.05 53.95 57.80 60.70 65.20 68.15 72.40 75.40 79.70 82.70 82.70 82.70 84.35 97.45	98.85 106.45 114.20 121.95 129.75 137.60 145.50 153.50 161.55 169.65



-		SOLI	D		1	SPLIT	,			SOLI		- 1 3	-00		
- 1			1	D'ble		DI III I	D'ble	-		DOLL	U	D'ble		SPLIT	
Diam I		S'gle Belt	D'ble Belt	Arm D'ble Belt	S'gle Belt	D'ble Belt	Arm D'ble Belt	Diam Inch			D'ble Belt	Arm D'ble Belt	S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt
	14 15 16 17 18 19 20 21 22 23 24 26 28 30 32 34 36 38		24. 757.25 27. 655.25 33. 455.25 36. 404 342. 304 45. 255.25 54. 255.25 551. 255.25 551. 256.25 57. 256.25 57. 257.25 572	86.55 93.05 99.55 106.15 112.75 119.30 125.95 132.65 139.35	27.70 30.10 33.70 36.15 39.80 42.25 45.95 48.45	31, 45 34, 35 38, 40 41, 30 45, 45, 45 48, 40 52, 55 55, 50 70, 00 74, 35 77, 40 81, 75, 84, 85 89, 30 92, 45 96, 95 100, 10	101.90 109.75 117.60 125.60 123.60 141.60 149.70 157.90 166.10	Largest Bore 47/6"	15 16 17 18 19 20 21 22 23 24 26 28 30 32 34 36 38		26.55 29.60 32.65 35.75 38.85 41.95 45.10 48.25 51.40 54.60 64.25 67.50 77.35 80.70 84.05 87.50	92.30 99.20 106.15 113.10 120.10 127.10 134.15 141.25 148.40 155.60	45.00 48.80 51.30	33.70 36.75 41.00 44.10 48.45 51.55.95 59.10 63.25 71.25 74.45 79.05 82.30 86.90 94.90 98.25 103.00 106.45	108.45 116.75 125.10 33.50 41.95 50.45 50.65 76.35
Largest Bore at Reg. Price 476	5 6 7 8 9 9 110 111 112 113 114 115 116 115 116 117 118 118 118 118 118 118 118 118 118	21. 75 24. 20 26. 70 29. 25 31. 80 36. 80 39. 30	25. 65 28. 65 31. 65 34. 65 37. 70 40. 75 43. 80 49. 95 53. 05 56. 15 59. 25 62. 40 65. 55 66. 55 67. 70 71. 80 75. 05 78. 25 81. 45 84. 75 1	89.65 96.35 09.90 16.70 23.50 30.35 37.20 44.10	28,90 31,35 35,05 37,60 41,40 43,90 47,65 50,15	35. 80 40.00 . 443.00 47. 30 . 50.30 . 54.65 57. 70 . 61. 80 64. 90 . 669.60 . 72. 70 72. 70 . 772.0 . 80.35 . 84. 85 80.35 . 84. 85 . 87. 95. 10 92. 60	305 . 80 13 . 90 22 . 00 30 . 30 83 . 55 16 . 85 16 . 85 10 . 10 . 10 . 10 . 10 . 10 . 10 . 10 .		4 5 6 7 8 9 10 11 12 13	20.80 23.35 25.95 28.55 31.20 33.85 36.50 39.15	24.35 27.50 30.65 33.85 37.05 40.25 43.45 46.70 49.95 53.20 56.50 59.80 63.10 66.45 69.80 73.15 76.55 79.95 83.40 11 11 11 11 11 11 11 11 11 11 11 11 11	95.60 92.75 99.90 11.45 18.65 18.65 18.65	27.05 30.95 33.55 37.40 40.05 44.00 46.65 50.60 53.05	30 60 35 10 38 25 42 70 45 90 45 90 50 40 55 3 60 61 40 66 70 69 00 73 95 77 25 82 00 87 75 90 10 98 35 11 80 12 18 13 14 16 16 17 18	22.55 11.15 19.75 10.77 15.5.85 4.60 2.20



		SOLI	D	- 1		SPLIT				SOLI	D			SPLIT	
Diam Inch	Face Inch	S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt	S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt	Diam Inch			D'ble Belt	D'ble Arm D'ble Belt	S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt
Largest Bore 47/" 4	17 18 19 20		28. 45 31.70 34.95 38.20 41.50 44.80 51.45 54.80 71.85 75.35 82.40 85.95 89.50 93.10	98.80 105.80 113.20 120.55 127.95 135.40 142.90 150.45 158.05 165.70		36, 05 39, 30 43, 80 47, 05 51, 65 54, 95 59, 55 62, 90 67, 30 70, 65 75, 70 79, 10 83, 95 87, 40 92, 30 95, 80 100, 80 112, 95	115, 75 124, 20 133, 05 141, 90 150, 80 159, 80 168, 83 178, 00 187, 20 196, 41	Largest Bor at Reg. Pri	11 12 13 14 15 16		31, 40 34, 90 38, 40 41, 95 45, 50 49, 10 52, 70 56, 35 60, 00 63, 70 67, 40 78, 70 86, 35 90, 25 90, 25 94, 15 98, 10 102, 05	1115.95 123.95 140.15 148.35 173.15 181.50 181.95		39.95 43.45 48.30 51.85 56.80 69.05 77.55 83.00 95.80 101.10 104.95 110.40 116.30 119.80	137. 145. 155. 165. 184. 194. 204.
Largest Bore 47,6" 8	20 21 22 23 24 26 28 30 32 34 36		6 29, 40 6 32, 75 6 36, 10 7 39, 45 7 42, 85 8 46, 25 8 46,	101.75 109.25	46.65 49.45 53.65 55.98) 37 44 40 80) 40 86) 45 44 6 48 86 6 57 96 6 61 77 73 11 78 37 81 88 86 85 90 44 99 07 104 20 107 87 113 00 116 70	5	Largest Bore 415," C	4 5 6 6 7 8 8 9 100 111 12 13 14 15 16 17 18 19 200 21 1 22 2 3 24 26 28 8 30 32 34 36 38 34 40		33 56 37 25 41 00 44 77 48 55 52 35 56 20 60 05 63 95 67 85 71 80 75 75 79 75 83 75 95 90 100 00 104 10 108 20	123.65		42. 55 46. 30 51. 44 55. 20 60. 44 64. 22 69. 55 73. 40 78. 50 82. 40 97. 65 101. 65 101. 65 111. 30 116. 94 121. 05 126. 77 130. 85	5



	SOLI	D		1	SPLIT	,	1		SOLI	D		d	SPLIT	,
Diam Face Inch	S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt	S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt	Diam Inch		S'gle	D'ble Belt	D'ble Arm D'ble Belt	S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt
$54 \begin{vmatrix} \frac{4}{5} \\ \frac{5}{6} \end{vmatrix}$		31.75 35.65 39.60			39.75 45.20 49.15		56	40			226.80			266.00
Largest Bore 415/18 10 10 10 10 10 10 10 10 10 10 10 10 10		43.55 47.55 51.55 55.60 59.65 63.75 67.85 72.00 76.15 80.35 84.55 88.80 93.05 97.35 101.65 106.03 110.35	131.25 140.25		54.55 58.55 64.05 68.10 73.65 77.75 83.10 87.25 97.45 103.25 107.50 113.35 117.65 123.60 127.95 133.95 133.95 133.95	153.20	Largest Bore 415/6" S	5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22		44.60 49.00 53.45 57.95 62.45 67.00 71.55 76.15 80.75 85.40 90.05 94.75 99.45 104.20 108.95 113.95 118.60			44.95 50.90 55.25 61.20 65.65 71.75 76.25 82.40 97.50 104.10 108.75 115.15 119.85 126.30 131.05 137.80 142.45	
56 4 5					42.30	174.55 185.40 196.35 207.35 218.40 229.50 240.60 251.95		26 28 30 32 34			157.40 167.55 177.65 187.80		154.05	183.00 194.95 206.85 218.85 230.90 243.05 255.30 267.65 280.30
Largest Bore 4.5_6 " at Reg. Price 4.5_6 " at Reg. Price 4.5_6 " at Reg. 112 at Reg. 124 at Reg. 244 at Reg. 244		42.05 46.20 50.40 54.65 58.95 63.25 67.50 71.85 76.25 80.65 85.10 89.55 94.05 94.05 98.55 103.10 107.65 1112.25 1112.25	139, 15 148, 50 158, 05 167, 75 177, 45 187, 20 197, 00		77. 95 82. 20 87. 85 92. 25 98. 50 103. 00 109. 10 113. 60 119. 75 124. 30 130. 55 135. 15 141. 45 46. 05	162.05	Largest Bore 415/6" 99	6 7 8 9 10 11 12 13 14 15 16 17 17 17 18 19 20 21 22 23 24 24 28 30		51. 85 56. 50 61. 20 65. 90 70. 65 75. 45 80. 30 85. 15 90. 05 95. 00 100. 00 105. 05 110. 10 115. 20 125. 55 130. 75 136. 00	155.45 166.00 176.65		58.45 64.65 69.30 75.65 80.35 86.75 91.55 97.80 102.65 109.55 114.50 121.25 126.30 133.10 138.20 445.15 150.35 162.60	180.25



		SOLL	D			SPLIT				SOLI	D			SPLIT	
Diam Inch		S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt	S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt	Diam Inch			D'ble Belt	D'ble Arm D'ble Belt	S'gle Belt	D'ble Belt	D'bl Arm D'bl Belt
60	36 38 40			231.05 242.20 253.45			269.05 282.10 295.45	64	38 40			263.00 275.20			305.7 320.1
62	4 5		40.50 45.15			50.55 56.95		66	6 7 8		60.50			75.25	
	6 7 8		49.85 54.60 59.40			61.65 68.05 72.85			9 10 11		75.65			87.10 92.20 99.15	
7/16 "	9 10 11		64.25			79.40 84.30 90.95		, 9I	12 13					104.35 111.15 116.45	
5	12 13 14		79.10 84.15 89.25			95.95 102.45		e 57			101.90			123.95 129.35	
Largest Bore at Reg. Price	15 16 17		94.40 99.60 104.85			119.95		st Bere g. Prie	18 19 20		118.25 123.80			142.20 149.65	
Large at Re	18 19 20		110.15 115.50 120.90			132.30 139.45		Largest i at Reg.			141.05	177.75		$163.00 \\ 168.85$	205.
	21 22 23		126.35 131.85	163.00		152.15 157.65	188.80				152.95	189.20 200.75 212.40		182 70	218
	24 26 28		142.95	174.00 185.15		170.60	201.65 214.70		30 32			224.15 236.00			259. 273.
	30 32 34			207.70 219.15			$241.10 \\ 254.50$		34 36 38			248.00 260.15 272.40			287. 302. 316.
	36 38 40			242.35			268.05 281.70 295.40 309.45	(0)	40 6		58.55			72.20	
64	6 7		52.65				1		7 8 9		73.8			84.13 91.13	5
UI	8 9 10					76.50 83.20)		11 12 13		79.05 84.30 89.60)		103.43 108.73	5
576"	11 12 13		77.40 82.50 87.65			95.00 100.10		1/16 "	14 15		94.93 100.33 105.80			121.10 128.75	
rice 5	14 15 16		92.85 98.10			111.98 119.30		Bore 5	16 17 18 19		116.88 122.50			141.78 147.40	
Largest Bore at Reg. Price	17 18 19		108.75 114.15			131.80 137.20)	Largest Boat at Reg. Ph	20 21 22		133 . 98 139 . 80			160.80 168.6	5
at]	20 21 22		125.10 130.65			150.00 157.45		1	23 24		151.80 157.98	197.10		181.68 188.80	227
	23 24 26		142.08 147.90	181.50		170.20 176.60	210.20		26 28 30			208, 80 220, 75 232, 80			255 269
	28 30 32		0.107.007.0	204.25 215.80			236.85 250.40		32 34 36		2 83 82 2 2 82 83 2 3 84 84 2	269.60			298 313
	34 34 36			227.45 239.20 251.05			277.80		38 40			282.10 294.70			



		SOLI	D			SPLIT	1	ı		SOLI	D			SPLIT	,
Dia Inch	Face Inch		D'ble Belt	D'ble Arm D'ble Belt	S'gle Belt	D'ble Belt	D'ote Arm D'ble Belt	Diam Inch			D'ble Belt	D'ble Arm D'ble Belt	S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt
70	6 7 8		61.50 66.70 71.95					74	11 12 13					117.40 123.20 130.85	
	9 10 11		77.85 82.65 88.10			95.30 100.70 108.05			14 15 16		113.50 119.60 125.80			136.85 145.30 151.50	
576"	12 13 14 15		93.60 99.13 104.73 110.40	5		126.35		576"	17 18 19		132.10 138.50 145.00			166.30 174.90	
	16 16 17 18		116.40 116.10 121.90 127.75)		139.95		Bore Price	20 21 22 23		151.60 158.35 165.20 172.15		.,	181.50 190.40 197.25 206.35	
Largest Bore at Reg. Price	19 20 21		133.70 139.75 145.90			161.55 167.60 175.80		Largest 1 at Reg.	24 26 28		179.20	223.50 236.50 249.70		213.40	257.3 272.9 288.3
	22 23 24		$158.50 \\ 164.90$	205.90		190.45 196.85	237.85		30 32 34			263.10 276.70 290.50			303.9 319.8 335.9
	26 28 30 32			218.15 230.45 242.90 255.50	5 5 5 5 5 5		266.60 281.20		36 38 40	***** *** ** ***** *** *		304.60 318.95 333.50			352.3 368.9 385.9
	34 36 38			268, 25 281, 15 294, 20			310.90	76	8 9 10		88.05			100.65 108.45	
70	40 6		64.55	307.45		79.50	356.80		11 12 13		99.85 105.90			114.30 122.30 128.35 136.30	
72	7 8 9		69.90 75.30 80.75			86.75 92.15 99.55		197	15 16		118.30			142.55 151.30 157.75	
<i>"</i> 9	10 11 12 13		86.25 91.80 97.40 103.10			118.15		Bore 5			137.65 144.30 151.10			166.45 173.10 182.05	
e 57/6"	14 15 16		103.85 114.70 120.65			$131.30 \\ 139.45$	******	Largest Bc at Reg. Pr	21 22		158.00 165.00 172.10 179.30			205.25	
Largest Bore at Reg. Price	17 18 19		126.70 132.85 139.10			$153.50 \\ 159.65$		Lar at	$\frac{24}{26}$		186.60	233.00 246.50 260.25		214.65 221.95	268.3 284.1 300.1
at R	21 22		145.45 151.90 158.45			174.30 182.85 139.40	232.90		30 32 34			274.20 288.40 302.85			$\frac{316.3}{332.8}$
	24 26			214.30 226.80		205.00	262.00		38			317.55 332.50 347.60			366.7 383.9 401.5
	30 32			239.45 252.35 265.45 278.75			276.80 291.90 307.20 322.75	78			91.90			105.05 113.10	
	36			292.25 306.00 320.00					11 12		104.10 110.40			127.40 133.70	
74			78.75 84.35			96.35 03.95			14 15 16		123.30 129.90 136.60			148.45 157.50	
	10		90.05	"		09.65		J	17		143.45			173.25	



	SOLI	D			SPLIT		1		SOLI	D			SPLIT	-
Diam Face Inch Inch		D'ble Belt	D'ble Arm D'ble Belt	S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt	Diam Inch		S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt	S'gle Belt	D'ble Belt	D'ble Arm D'ble Belt
78 18 199 20 21 20 21 20 21 20 20 21 20 20 20 20 20 20 20 20 20 20 20 20 20			242.90 256.95 271.25 285.80 300.60 315.60 330.85 346.35		196.60 206.10 213.45 223.15 230.70	279.40 295.75 312.35 329.25 346.40		32 34 36 38 40 8 9 10 11 12 13		97.50 104.20 111.00 117.90 124.95 132.10	279 .20 294 .60 310 .35 326 .30 342 .50 359 .95 375 .65 392 .60		119.00 127.95 134.75 143.90 150.95	374.9 393.6 412.5 431.7 451.5
Tarkest Bore 27/6" at Reg. Price 27/6" 2 24 Reg. Price 2 24 26 26 26 26 26 26 26 26 26 26 26 26 26		95.90 102.20 108.60 115.15 121.80 128.55 135.40 142.35 149.40 156.60 171.30 178.85 186.40 194.20 202.10))))) 253.35 267.95		132.80 139.35 147.90 154.65 164.00 170.95 180.25 187.45 197.00 204.40 214.25 221.80 231.90 239.80	291.05	Largest Bore at Reg. Price 5	16 17 18 19		154.35 162.00 169.80 177.70 185.75 193.90 202.20 210.60 219.00	274.90 290.60 306.70 333.65 356.50 373.60 391.00 408.65		184. 95 194. 95 202. 75 213. 00 221. 05 231. 60 239. 90 250. 70 259. 10	333.1 351.3 370.4 389.4 409.4 428.4 448.4
282 344 303 323 344 368 374 384 400 311 11 11 11 11 11 11 11 11 11 11 11 11		93.55 100.00 106.55 113.20 126.90 133.90 141.05 148.30 155.65 163.18 170.75 170.75	297.85 313.15 328.70 344.50 360.55 376.85		114. 25 122. 96 129. 45 138. 30 145. 10 153. 95 160. 95 170. 65 177. 90 187. 55 195. 06 204. 95	342.65 360.35 378.35 396.60 415.05 433.95	t Bore 57/6"	9 10 11 12 13 14 15 16 17 18		108.56 115.60 122.80 130.13 137.60 145.20 160.73 168.70 176.80 185.00 193.33 201.80 210.33 210.33 210.36) 5 5 6 6 7 8 9 1 1 1 1 1 1 1 1 1 1 1 1 1		133 . 14 140 . 24 149 . 76 157 . 10 166 . 60 174 . 20 184 . 55 192 . 44 . 202 . 74 . 210 . 84 . 221 . 44 . 229 . 8 . 240 . 70 . 249 . 24 . 260 . 34 . 260 . 34	5 5 5 6 7 7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8



TIGHT AND LOOSE PULLEYS ADD.TIONAL PRICE TO BE ADDED TO THE LIST PRICE

Diameter			FA	CE, INCHES			
Inches	3 and 4	5 and 6	7 and 8	9 and 10	11 and 12	13 and 14	15 and 16
6 to 9 10 to 15 16 to 20 21 to 30 31 to 42 43 to 60	1.30 1.50 2.10 3.30 4.50 6.00	2.00 2.30 2.90 4.10 5.50 7.40	3.00 3.40 4.00 5.20 6.90 9.30	4.50 5.00 5.50 6.80 9.00 12.00	7.00 7.50 9.10 12.10 15.80	12.50 16.50 21.00	

Additional Prices for Bores Larger than Maximum as Specified in Standard List

Diameter		
6 to 15 inches 16 to 30 inches 31 to 60 inches	Add 10 per cent for each additional 14 inch or fractional part thereof. Add 10 per cent for each additional 14 inch or fractional part thereof. Add 5 per cent for each additional 16 inch or fractional part thereof.	

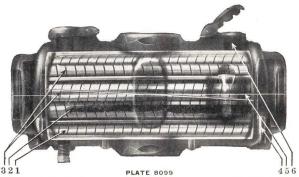
DOUBLE FLANGE PULLEYS ADDITIONAL PRICE TO BE ADDED TO THE LIST PRICE

Diameter, Inches	Price	Diameter, 1nches	Price
6 to 7	2.40	46 to 47	33.85
8 to 9	3.10	48 to 50	37.60
10 to 11	3.90	51 to 54	42.25
12 to 13		56 to 58	47.20
14 to 15		60 to 62	52.25
l6 to 17		61 to 66	57.50
8 to 19		68 to 70	62.85
20 to 21	0.00	72 to 74	68.30
22 to 23		76 to 78	73.75
24 to 25		80 to 82	79.30
26 to 27		84 to 86	84.75
28 to 29		88 to 90	90.10
30 to 31		92 to 94	95.40
22 to 33		96 to 98	100.85
84 to 35		100 to 102	106.00
36 to 37		104 to 106.	111.80
8 to 39		108 to 110	117.15
0 to 41		112 to 114.	122.35
2 to 43		116 to 118	127.35
4 to 45		120	132.05

Pulleys with one flange only take one-half of the above list.

Pulleys with three flanges take one-half more than the list given above.

HYATT LINE SHAFT BEARINGS



NOTE LARGE ROLLER DIAMETER—THIS MEANS SLOWER SPEED—HENCE LONGER LIFE AND INCREASED EFFICIENCY

- (1) Flexible rollers insure full line contact—an even distribution of load over the entire bearing surface—permitting direct-on-shaft operation.
- (2) Hollow rollers are natural oil reservoirs, able to take a liberal charge of lubricant at a time—this means long intervals between oiling.
- (3) Rollers are assembled right and left-hand spirals, insuring an automatic and reliable circulation of oil.
- (4) Oil wipers on each end of boxes prevent oil from running along shafting.
- (5) Split to facilitate erection; can be mounted on erected shaft without taking same down or removing couplings, pulleys or clutches.
- (6) Oil hole fitted with self-closing cap, easily accessible. One-half pint when starting is sufficient to operate a 1 15 inch bearing four to five months without further attention.

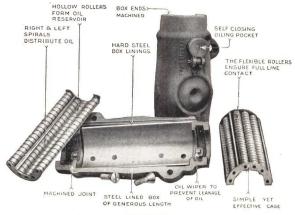


PLATE 8100



HYATT LINE SHAFT BEARINGS

HYATT STANDARD SHAFTING BOXES

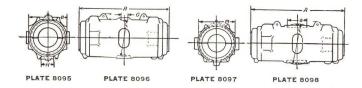
The following list prices are for boxes only, suitable for frames having four set screw adjustments, for ball and socket frames and for universal giant frames.

LINE SHAFT BEARINGS ONLY

Diam. of ShaftInches	$1\frac{7}{16}$	$1\frac{11}{16}$	$1\frac{15}{16}$	$2\frac{3}{16}$	$2\frac{7}{16}$	2 11	$2\frac{15}{16}$	$3\frac{3}{16}$
Price	11.35	12.85	13.70	18.00	22.40	26.85	31.70	37.25
Diameter of Shaft	Inches	$3\frac{7}{16}$	$3\frac{11}{16}$	$3\frac{15}{16}$	4 7 16	4 15	$5\frac{7}{16}$	$5\frac{15}{16}$
Price		83.70	109.25	135.75	158.90	190.40	281.25	390.00

Even inches and their fractions take list of nearest sixteenth plus 10 per cent. in sizes up to and including $3\frac{1}{16}$ inches. Above that list is the same.

DIMENSIONS OF HYATT STANDARD BOXES



EITHER U-G or B. & S. BOXES MAY BE USED IN FOUR SET SCREW HANGERS

Diam.				В		F	(ī	Н	
Inches	Los.	BS	UG	BS	UG	BS	UG	BS	UG	UG
$1\frac{7}{16}$	11	81/4	81/4	3 3/4	3 5/8	3 3/4	3 7/8	1 15	11/4	1 11 16
$\begin{array}{c} 1 \frac{7}{16} \\ 1 \frac{11}{16} \\ 1 \frac{15}{16} \\ 2 \frac{3}{16} \\ 2 \frac{1}{16} \\ 2 \frac{1}{16} \\ 2 \frac{1}{16} \\ \end{array}$	14 22	91/4	914	3 7/8	$\begin{array}{c} 3 \overset{3}{\cancel{4}} \\ 4 \overset{1}{\cancel{1}} \overset{2}{\cancel{2}} \\ 4 \overset{7}{\cancel{8}} \end{array}$	$3\frac{7}{8}$	4	$1\frac{15}{16}$ $1\frac{15}{16}$	1 1/4	1 11
2 3	27	$10\frac{1}{2}$ $11\frac{1}{2}$	$10\frac{1}{2}$ $11\frac{1}{2}$	4 1/2 4 7/8	4 7/2	4 ½ 4 ½ 4 ½	4 7/8 5	$\frac{2}{2}\frac{1}{2}$	$\begin{array}{c} 1 \frac{3}{4} \\ 1 \frac{3}{4} \end{array}$	$\begin{array}{c} 2\frac{3}{16} \\ 2\frac{3}{16} \\ 2\frac{3}{16} \\ 2\frac{3}{16} \end{array}$
$\frac{16}{2\frac{7}{16}}$	38	13	13	5 5/8	5 1/2	5 5 8	5 3/4	3	1 34	$2\frac{16}{3}$
$2\frac{11}{16}$	46	14	14	5 7/8	5 1/2	5 7/8	6	3	1 3/4	$2\frac{3}{16}$
2 15	60	151/4	151/4	63/8	63/8	6 1/2	6 1/2	3 1/2	2 1/4	$2\frac{11}{16}$
3 16	67	161/2	161/2	63/8	63/8	6 1/2	6 3 4	3 1/2	21/4	$2\frac{11}{16}$
9 15	110	171/4	171/4	$7\frac{1}{4}$ $8\frac{3}{4}$	71/8	714	7 1/2	$\frac{3\frac{3}{4}}{4\frac{5}{8}}$	2 1/4	$2\frac{11}{16}$
1 16	230 280	$\frac{20}{22\frac{1}{4}}$	$\frac{20}{22\frac{1}{4}}$	914	8 ½ 8 5/8	$\frac{10 \frac{1}{2}}{10 \frac{1}{2}}$	10	4 3/8	2 7/8	$\frac{3\frac{3}{16}}{3}$
1 16	330	24 1/2	1111	95/8		$10\frac{1}{2}$	40.000	$\frac{5}{6}\frac{1}{2}$	2 3/4	3
5 7	380	24 34		1034		12				
$\begin{array}{c} 3\frac{3}{16} \\ 3\frac{7}{16} \\ 3\frac{15}{16} \\ 4\frac{7}{16} \\ 4\frac{15}{16} \\ 5\frac{7}{16} \\ 5\frac{15}{16} \end{array}$	500	30		12		12 5/8		678		

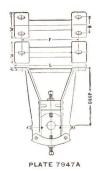
You will note from the above measurements that the regular sizes of hanger frames can not be used with the corresponding sized boxes. We will be glad to furnish any information concerning this.



1914 "PIONEER" SAFETY STEEL SHAFT HANGER BABBITTED BEARINGS, RING OR WICK OILING



PLATE 7947



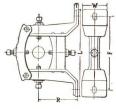


PLATE 7947B

List and dimensions on following pages.



"PIONEER" STEEL DROP AND POST HANGERS, WALL BRACKETS AND FLOOR STANDS

Size Shaft Inches	Drop Inches	Price †	*F Inches	*L Inches	T Inches	W Inches	H Inches	No. of Bolts	Size Bolts Inch
15 16	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	5.00 5.00 5.40 6.15 7.00	$\begin{array}{c} 10\frac{3}{4} \\ 10\frac{1}{4} \\ 12\frac{1}{2} \\ 14\frac{1}{8} \\ 17\frac{3}{8} \end{array}$	$\begin{array}{c} 13 \\ 12\frac{1}{2} \\ 15\frac{1}{4} \\ 16\frac{3}{4} \\ 20 \end{array}$	$\frac{7}{16}$ $\frac{7}{16}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	$3\frac{3}{4}$ $5\frac{1}{4}$ $5\frac{1}{2}$ $5\frac{1}{2}$ $5\frac{1}{2}$	3 16	2 2 2 2 4	5 8 5 8 5 8 5 8 5 8
$1\frac{3}{16}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	5.00 5.00 5.40 6.15 7.00	$\begin{array}{c} 10\frac{3}{4} \\ 10\frac{1}{4} \\ 12\frac{1}{2} \\ 14\frac{1}{8} \\ 17\frac{3}{8} \end{array}$	$\begin{array}{c} 13 \\ 12 \frac{1}{2} \\ 15 \frac{1}{4} \\ 16 \frac{3}{4} \\ 20 \end{array}$	$\begin{array}{c} \frac{7}{166} \\ \frac{7}{1} \\ 1/2 \\ 1$	$3\frac{3}{4}$ $5\frac{1}{4}$ $5\frac{1}{2}$ $5\frac{1}{2}$	$3\frac{1}{16}$	2 2 2 2 4	5/8 5/8 5/8 5/8
1 7/16	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	5.30 5.30 5.70 6.45 7.30	$\begin{array}{c} 10\frac{3}{4} \\ 10\frac{1}{4} \\ 12\frac{1}{2} \\ 14\frac{1}{8} \\ 17\frac{3}{8} \end{array}$	$\begin{array}{c} 13 \\ 12 \frac{1}{2} \\ 15 \frac{1}{4} \\ 16 \frac{3}{4} \\ 20 \end{array}$	$\frac{7}{16}$ $\frac{7}{16}$ $\frac{1}{2}$ $\frac{1}{2}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	3 1/16	2 2 2 2 4	5/8 5/8 5/8 5/8 1/2
1 11 16	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	6.10 6.10 6.50 7.25 8.10 11.55 15.00	$\begin{array}{c} 10{}^{3}4\\ 10{}^{1}4\\ 12{}^{1}2\\ 14{}^{1}8\\ 17{}^{3}8\\ 20{}^{3}6\\ 23{}^{7}8\\ \end{array}$	13 $12\frac{1}{2}$ $15\frac{1}{4}$ $16\frac{3}{4}$ 20 $23\frac{5}{8}$ $27\frac{7}{8}$	7 16 16 1/2 1/2 1/2 1/2 1/2	$ \begin{array}{c} 3 & 34 \\ 5 & 14 \\ 5 & 1/2 \\ 5 & 1/2 \\ 5 & 1/2 \\ 6 & 1/2 \\ 7 & 1/2 \\ \end{array} $	$\begin{smallmatrix} 3 & \frac{1}{16} \\ 4 & 4 \end{smallmatrix}$	2 2 2 2 4 4 4	5/8/8/8/8/5/8/8/5/8/8/8/8/8/8/8/8/8/8/8
$1\frac{15}{16}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	6.95 6.95 7.35 8.10 8.95 12.40 15.85	$\begin{array}{c} 10 {}^{3}4\\ 10 {}^{1}4\\ 12 {}^{1}2\\ 14 {}^{1}8\\ 17 {}^{3}8\\ 20 {}^{3}{}^{1}6\\ 23 {}^{7}8\\ \end{array}$	$\begin{array}{c} 13 \\ 12 \frac{1}{2} \\ 15 \frac{1}{4} \\ 16 \frac{3}{4} \\ 20 \\ 23 \frac{5}{8} \\ 27 \frac{7}{8} \end{array}$	$\begin{array}{c} 7 \\ 16 \\ \hline 7 \\ 16 \\ 1 \\ 2 \\ 2$	$3\frac{3}{4}$ $5\frac{1}{4}$ $5\frac{1}{2}$ $5\frac{1}{2}$ $6\frac{1}{2}$ $7\frac{1}{2}$	$\begin{array}{c} 3\frac{1}{16}\\ 4\\ 4\end{array}$	2 2 2 2 4 4 4	5/8/8/8/8/8/8 5/8/8/8/8/8/8/8/8/8/8/8/8/
$2\frac{3}{16}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	9.35 9.35 9.65 10.50 11.45 12.70 16.15	$\begin{array}{c} 12 \frac{7}{8} \\ 11 \frac{1}{4} \\ 13 \frac{3}{8} \\ 15 \frac{1}{8} \\ 20 \frac{3}{16} \\ 23 \frac{7}{8} \end{array}$	$15\frac{1}{2}$ $14\frac{1}{8}$ $16\frac{1}{2}$ 18 21 $23\frac{5}{8}$ $27\frac{7}{4}$	5/8 1/2 5/8 5/8 1/2 1/2 1/2	$\begin{array}{c} 4\frac{1}{2} \\ 5\frac{1}{2} \\ 6\frac{1}{2} \\ 6\frac{1}{2} \\ 6\frac{1}{2} \\ 6\frac{1}{2} \\ 7\frac{1}{2} \end{array}$	4 4 4	2 2 2 2 4 4 4	3/4 3/4 3/4 3/4 5/8 5/8



"PIONEER" STEEL DROP AND POST HANGERS, WALL BRACKETS AND FLOOR STANDS

(CONTINUED)

Size Shaft Inches	Drop Inches	Price	*F Inches	*L Inches	T Inches	W Inches	H Inches	No. of Bolts	Size Bolts Inch
$2\frac{7}{16}$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	10.65 10.65 10.95 11.80 12.75 14.00 17.45	$\begin{array}{c} 12 \frac{7}{8} \\ 11 \frac{1}{4} \\ 13 \frac{3}{8} \\ 15 \frac{1}{8} \\ 17 \frac{5}{8} \\ 20 \frac{3}{16} \\ 23 \frac{7}{8} \end{array}$	$\begin{array}{c} 15\frac{1}{2} \\ 14\frac{1}{8} \\ 16\frac{1}{2} \\ 18 \\ 21 \\ 23\frac{5}{8} \\ 27\frac{7}{8} \end{array}$	5/8 1/2 5/8 5/8 1/2 1/2 1/2	$\begin{array}{c} 4 \stackrel{1}{\cancel{1}}_2 \\ 5 \stackrel{1}{\cancel{1}}_2 \\ 6 \stackrel{1}{\cancel{1}}_2 \\ 6 \stackrel{1}{\cancel{1}}_2 \\ 6 \stackrel{1}{\cancel{1}}_2 \\ 6 \stackrel{1}{\cancel{1}}_2 \\ 7 \stackrel{1}{\cancel{1}}_2 \end{array}$	4 4 4	2 2 2 2 4 4 4	3/4 3/4 3/4 3/4 5/8 5/8
2 116	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	12.75 12.75 13.05 13.90 14.85 16.10 19.55	$\begin{array}{c} 12 \frac{7}{8} \\ 11 \frac{1}{4} \\ 13 \frac{3}{8} \\ 15 \frac{1}{8} \\ 17 \frac{5}{8} \\ 20 \frac{3}{16} \\ 23 \frac{7}{8} \end{array}$	$\begin{array}{c} 15\frac{1}{2} \\ 14\frac{1}{8} \\ 16\frac{1}{2} \\ 18 \\ 21 \\ 23\frac{5}{8} \\ 27\frac{7}{8} \end{array}$	5/8 1/2 5/8 5/8 1/2 1/2 1/2	$\begin{array}{c} 4 \frac{1}{2} \\ 5 \frac{1}{2} \\ 6 \frac{1}{2} \\ 6 \frac{1}{2} \\ 6 \frac{1}{2} \\ 6 \frac{1}{2} \\ 7 \frac{1}{2} \end{array}$	4 4 4	2 2 2 2 4 4 4	3/4/3/4/3/4/5/8/5/8/5/8/8
2 15	$\begin{array}{cccc} 7 & -9 \\ 10 & -12 \\ 14 & -16 \\ 18 & -20 \\ 22 & -24 \\ 28 & -30 \end{array}$	15.50 15.50 17.00 19.00 20.50 27.50	$\begin{array}{c} 13\frac{1}{8} \\ 14\frac{7}{16} \\ 16\frac{1}{8} \\ 19 \\ 22\frac{1}{4} \\ 24\frac{3}{4} \end{array}$	$\begin{array}{c} 16\frac{1}{4} \\ 18\frac{1}{16} \\ 19\frac{1}{8} \\ 23\frac{1}{16} \\ 25\frac{5}{8} \\ 34\frac{1}{4} \end{array}$	5/8 3/4 3/4 5/8 5/8 2	$\begin{array}{c} 6\frac{1}{2} \\ 7\frac{1}{2} \\ 7\frac{1}{2} \\ 7\frac{1}{2} \\ 7\frac{1}{2} \\ 7\frac{1}{2} \\ 8 \end{array}$	4 4	2 2 2 4 4 2	7/8 7/8 7/8 3/4 3/4 1
$3\frac{3}{16}$	$\begin{array}{c} 11-13 \\ 14-16 \\ 18-20 \\ 22-24 \\ 28-30 \end{array}$	$\begin{array}{c} 20.00 \\ 22.50 \\ 25.00 \\ 26.50 \\ 28.50 \end{array}$	$17\frac{1}{8}$ $18\frac{1}{2}$ $20\frac{7}{8}$ $23\frac{5}{8}$ $24\frac{3}{4}$	$\begin{array}{c} 25 \frac{1}{2} \\ 27 \frac{1}{2} \\ 30 \frac{1}{8} \\ 32 \frac{3}{8} \\ 34 \frac{1}{4} \end{array}$	2 2 2 2 2	8 8 8 8		2 2 2 2 2 2	1 1 1 1
$3\frac{7}{16}$	$\begin{array}{c} 11-13 \\ 14-16 \\ 18-20 \\ 22-24 \\ 28-30 \end{array}$	22.00 24.50 27.00 28.50 30.50	$17\frac{1}{8}$ $18\frac{1}{2}$ $20\frac{7}{8}$ $23\frac{5}{8}$ $24\frac{3}{4}$	$\begin{array}{c} 25 \frac{1}{2} \\ 27 \frac{1}{2} \\ 30 \frac{1}{8} \\ 32 \frac{3}{8} \\ 34 \frac{1}{4} \end{array}$	2 2 2 2 2	8 8 8 8		2 2 2 2 2	1 1 1 1
3 15 16	11-13 14-16 18-20 22-24 28-30	26.00 28.50 31.00 32.50 34.50	$\begin{array}{c} 17\frac{1}{8} \\ 18\frac{1}{2} \\ 20\frac{7}{8} \\ 23\frac{5}{8} \\ 24\frac{3}{4} \end{array}$	$\begin{array}{c} 25\frac{1}{2} \\ 27\frac{1}{2} \\ 30\frac{1}{8} \\ 32\frac{3}{8} \\ 34\frac{1}{4} \end{array}$	2 2 2 2 2 2	8 8 8 8		2 2 2 2 2	1 1 1 1



"PIONEER" STEEL WALL BRACKETS

Size Shaft Inches	Reach "R" Inches	Price	*F Inches	*L Inches	T Inches	W Inches	H Inches	No. of Bolts	Size Bolts Inch
15 16	$\begin{array}{c} 8\frac{1}{2} \\ 11\frac{1}{2} \\ 15\frac{1}{2} \\ 19\frac{1}{2} \end{array}$	5.50 5.90 6.90 8.00	$\begin{array}{c} 10\frac{1}{4}\\ 12\frac{1}{2}\\ 14\frac{1}{8}\\ 17\frac{3}{8} \end{array}$	$\begin{array}{c} 12 \frac{1}{2} \\ 15 \frac{1}{4} \\ 16 \frac{3}{4} \\ 20 \end{array}$	7 16 1/2 1/2 1/2 1/2	$ 5\frac{1}{4} $ $ 5\frac{1}{2} $ $ 5\frac{1}{2} $ $ 5\frac{1}{2} $ $ 5\frac{1}{2} $	$3\frac{1}{16}$	2 2 2 4	5/8 5/8 5/8 1/2
$1\frac{3}{16}$	$\begin{array}{c} 8\frac{1}{2} \\ 11\frac{1}{2} \\ 15\frac{1}{2} \\ 19\frac{1}{2} \end{array}$	5.50 5.90 6.90 8.00	$\begin{array}{c} 10\frac{1}{4} \\ 12\frac{1}{2} \\ 14\frac{1}{8} \\ 17\frac{3}{8} \end{array}$	$\begin{array}{c} 12\frac{1}{2} \\ 15\frac{1}{4} \\ 16\frac{3}{4} \\ 20 \end{array}$	$\frac{7}{16}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	$ \begin{array}{r} 5 \frac{1}{4} \\ 5 \frac{1}{2} \\ 5 \frac{1}{2} \\ 5 \frac{1}{2} \end{array} $	3 16	2 2 2 4	5/8 5/8 5/8 1/2
1 7 16	$ \begin{array}{c} 8 \frac{1}{2} \\ 11 \frac{1}{2} \\ 15 \frac{1}{2} \\ 19 \frac{1}{2} \end{array} $	5.80 6.20 7.20 8.30	$\begin{array}{c} 10\frac{1}{4} \\ 12\frac{1}{2} \\ 14\frac{1}{8} \\ 17\frac{3}{8} \end{array}$	$\begin{array}{c} 12\frac{1}{2} \\ 15\frac{1}{4} \\ 16\frac{3}{4} \\ 20 \end{array}$	$\frac{7}{16}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	$ \begin{array}{r} 5 \frac{1}{4} \\ 5 \frac{1}{2} \\ 5 \frac{1}{2} \\ 5 \frac{1}{2} \end{array} $	$3\frac{1}{16}$	2 2 2 4	5/8 5/8 5/8 1/2
1 11 16	$ \begin{array}{c} 8\frac{1}{2} \\ 11\frac{1}{2} \\ 15\frac{1}{2} \\ 19\frac{1}{2} \end{array} $	6.60 7.00 8.00 9.10	$\begin{array}{c} 10\frac{1}{4} \\ 12\frac{1}{2} \\ 14\frac{1}{8} \\ 17\frac{3}{8} \end{array}$	$\begin{array}{c c} 12 \frac{1}{2} \\ 15 \frac{1}{4} \\ 16 \frac{3}{4} \\ 20 \end{array}$	$\frac{7}{16}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	$ 5\frac{1}{4} $ $ 5\frac{1}{2} $ $ 5\frac{1}{2} $ $ 5\frac{1}{2} $	$3\frac{1}{16}$	2 2 2 4	5/8 5/8 5/8 1/2
1 15	$8\frac{1}{2}$ $11\frac{1}{2}$ $15\frac{1}{2}$ $19\frac{1}{2}$	7.95 8.35 9.10 10.45	$\begin{array}{c} 11 \\ 13\frac{1}{4} \\ 14\frac{7}{8} \\ 18\frac{1}{8} \end{array}$	$\begin{array}{c} 13\frac{1}{4} \\ 16 \\ 17\frac{1}{2} \\ 20\frac{3}{4} \end{array}$	$\frac{7}{16}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	$ 5\frac{1}{4} $ $ 5\frac{1}{2} $ $ 5\frac{1}{2} $ $ 5\frac{1}{2} $	3 1/16	2 2 2 4	5/8 5/8 5/8 1/2
$2\frac{3}{16}$	$8\frac{1}{2}$ $11\frac{1}{2}$ $15\frac{1}{2}$ $19\frac{1}{2}$ $23\frac{1}{2}$	9.85 10.40 11.50 12.45 14.70	$\begin{array}{c} 11{}^{1}\!\!\!/_{4} \\ 13{}^{3}\!\!\!/_{8} \\ 15{}^{1}\!\!\!/_{8} \\ 17{}^{5}\!\!\!/_{8} \\ 20{}^{3}\!\!\!/_{16} \end{array}$	$14\frac{1}{8}$ $16\frac{1}{2}$ 18 21 $23\frac{5}{8}$	1/2 5/8 5/8 1/2 1/2	$ \begin{array}{c} 51/2 \\ 61/2 \\ 61/2 \\ 61/2 \\ 61/2 \\ 61/2 \\ \end{array} $	4 4	2 2 2 4 4	3/4 3/4 3/4 5/8 5/8
2 7/16	$8\frac{1}{2}$ $11\frac{1}{2}$ $15\frac{1}{2}$ $19\frac{1}{2}$ $23\frac{1}{2}$	11.65 11.95 13.80 14.75 17.00	$\begin{array}{c c} 12\frac{1}{4} \\ 14\frac{3}{8} \\ 16\frac{1}{8} \\ 19 \\ 21\frac{3}{16} \end{array}$	$15\frac{1}{8}$ $17\frac{1}{2}$ 19 22 $24\frac{5}{8}$	1/2 5/8 5/8 1/2 1/2	$ \begin{array}{c} 5 \frac{1}{2} \\ 6 \frac{1}{2} \\ 6 \frac{1}{2} \\ 6 \frac{1}{2} \\ 6 \frac{1}{2} \end{array} $	4 4	2 2 2 4 4	3/4 3/4 3/4 5/8 5/8
2 11 16	$8\frac{1}{2}$ $11\frac{1}{2}$ $15\frac{1}{2}$ $19\frac{1}{2}$ $23\frac{1}{2}$	13.75 14.05 15.90 16.85 19.10	$\begin{array}{c} 12\frac{1}{4} \\ 14\frac{3}{8} \\ 16\frac{1}{8} \\ 19 \\ 21\frac{3}{16} \end{array}$	$15\frac{1}{8}$ $17\frac{1}{2}$ 19 22 $24\frac{5}{8}$	1/2 5/8 5/8 1/2 1/2	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	4 4	2 2 2 4 4	3/4 3/4 3/4 5/8 5/8
2 15 16	$11\frac{1}{2}$ $15\frac{1}{2}$ $19\frac{1}{2}$ $23\frac{1}{2}$	17.50 20.00 22.50 24.50	$\begin{array}{c} 15\frac{7}{16} \\ 17\frac{1}{8} \\ 20 \\ 23\frac{1}{4} \end{array}$	$\begin{array}{c} 19\frac{1}{16} \\ 20\frac{1}{8} \\ 24\frac{1}{16} \\ 26\frac{5}{8} \end{array}$	3/4 3/4 5/8 5/8	$\begin{array}{c} 7\frac{1}{2} \\ 7\frac{1}{2} \\ 7\frac{1}{2} \\ 7\frac{1}{2} \\ 7\frac{1}{2} \end{array}$	4 4	2 2 4 4	7/8 7/8 3/4 3/4

†When fitted with "Standard" Bearings.

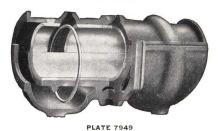
^{*}These dimensions may vary slightly from those given.



"STANDARD" AND "COLLAR END" BEARINGS

RING OR WICK OILING

"STANDARD"



BORE IN INCHES

Size Shaft Inches	15 16	$1\frac{3}{16}$	$1\frac{7}{16}$	$1\frac{11}{16}$	$1\frac{15}{16}$	$2\frac{3}{16}$
Price each	1.35	1.35	1.65	2.45	3.30	3.60
Size Shaft Inches	$2\frac{7}{16}$	$2\frac{11}{16}$	$2\frac{15}{16}$	$3\frac{3}{16}$	3 7/16	$3\frac{15}{16}$
Price each	4.90	7.00	8.00	9.00	11.00	15.00

"COLLAR END"



PLATE 7950 BORE IN INCHES

Size of ShaftInches	$\frac{1.5}{1.6}$	$1\frac{3}{16}$	$1\frac{7}{16}$	$1\frac{11}{16}$	1 15	$2\frac{3}{16}$
Price	1.35	1.35	1.65	2.45	3.30	3.60
Size of Shaft	$2\frac{7}{16}$	$2\frac{11}{16}$	$2^{\frac{15}{16}}$	$3\frac{3}{16}$	$3\frac{7}{16}$	$3\tfrac{15}{16}$
Price each	4.90	7.00	8.00	9.00	11.00	15.00



"PIONEER" GIRDER CLAMPS



PLATE 7848

Note.-All Girder Clamps are 2 inches thick.

		For Girders wit	h Flanges 3½ in	nch to 5 inches w	ide
SYMBOL	Price per Pair	Range of Shaft Sizes †Inches	Range of Drops †Inches	No. and Size of Girder Bolts Used in Each *Clamp	No. and Size of Hanger Bolts ††Inches
No. 1 S. N. No. 1 S. W. No. 2 S. N. No. 2 S. W.	5.50 6.50 6.00 9.50	$\begin{array}{c} 1\frac{3}{16} \text{ to } \frac{1}{16}\frac{15}{16} \\ 1\frac{3}{16} \text{ to } 1\frac{15}{16} \\ 2\frac{3}{16} \text{ to } 2\frac{1}{16} \\ 1 & \& 1\frac{15}{16} \\ 2\frac{3}{16} \text{ to } 2\frac{11}{16} \\ 2\frac{3}{16} \text{ to } 2\frac{11}{16} \end{array}$	5½ to 16 18 to 20 5¾ to 16 22 to 24 18-20-28-30	2-½ x 3½ 4-½ x 3½ 2-58 x 3¾ 4-58 x 3¾	$\begin{array}{c} 2 - \frac{5}{8} \times 1 \frac{3}{4} \\ 4 - \frac{1}{2} \times 1 \frac{1}{2} \\ 2 - \frac{3}{4} \times 2 \\ 4 - \frac{5}{8} \times 2 \end{array}$
No. 3 S. N. No. 3 S. W. No. 4 S. W.	$6.50 \\ 9.50 \\ 12.00$	$\begin{array}{c} 2\frac{3}{16} \text{ to } 2\frac{11}{16} \\ 2\frac{15}{16} \\ 2\frac{15}{16} \\ 2\frac{15}{16} \\ 2\frac{15}{16} \\ 2\frac{15}{16} \\ 3\frac{3}{16} \text{ to } 3\frac{15}{16} \\ 3\frac{3}{16} \end{array}$	7 to 16 18 to 24 28 to 30 11 to 30	2-5/8 x 3 3/4 4-5/8 x 3 3/4 4-5/8 x 3 3/4	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
	H	or Girders with	Flanges $5\frac{1}{16}$ in	ch to 6½ inches	wide
No. 1 L. N. No. 1 L. W. No. 2 L. N. No. 2 L. W.	6.50 7.50 7.00 11.00	$\begin{array}{c} 1\frac{3}{16} \text{ to } 1\frac{15}{16} \\ 1\frac{3}{16} \text{ to } 1\frac{15}{16} \\ 2\frac{3}{16} \text{ to } 2\frac{11}{16} \\ 2\frac{3}{16} \text{ to } 2\frac{11}{16} \\ \text{ to } 2\frac{11}{16} \end{array}$	5½ to 16 18 to 20 5¾ to 16 18-20-28-30 18-20-28-30	$\begin{array}{c} 2 - \frac{1}{2} \times 3\frac{1}{2} \\ 4 - \frac{1}{2} \times 3\frac{1}{2} \\ 2 - \frac{5}{8} \times 3\frac{3}{4} \\ 4 - \frac{5}{8} \times 3\frac{3}{4} \end{array}$	$\begin{array}{ c c c c c c c }\hline 2-\frac{5}{8} & x & 1\frac{3}{4} \\ 4-\frac{1}{2} & x & 1\frac{1}{2} \\ 2-\frac{3}{4} & x & 2 \\ 4-\frac{5}{8} & x & 2 \\\hline \end{array}$
No. 3 L. N. No. 3 L. W. No. 3 L. W.	8.00 11.00 13.50	$\begin{array}{c} 2\frac{15}{16} \\ 2\frac{15}{16} \\ 2\frac{15}{16} \\ 2 \\ 3 \\ \end{array} \text{ to } 3\frac{15}{16}$	7 to 16 18-20-22-24 28 to 30 11 to 30	2-5/8 x 3 3/4 4-5/8 x 3 3/4 4-5/8 x 3 3/4	$\begin{array}{cccccccccccccccccccccccccccccccccccc$

^{*}Bolts for attaching clamps to girders are 'urnished gratis.

 $[\]dagger\dagger Bolts$ for attaching hangers to clamps are not included in price of clamps. These bolts should have square heads and hex. nuts.

[†]These dimensions are inclusive.



"PIONEER" STEEL POST HANGERS

Size Shaft Inches	Reach "R" Inches	Price	*F Inches	*L Inches	T Inches	W Inches	H Inches	No. of Bolts	Size Bolts Inch
15	6	5.00	10 3/4	13	7	3 3/4		2	5/6
$1\frac{\frac{15}{16}}{\frac{3}{16}}$	6	5.00	10 3/4	13	7	3 3/4		2 2	5/8
$1\frac{7}{16}$	6	5.30	10 3/4	13	7 16	3 3/4		2	5/8
$1\frac{1}{16}$ $1\frac{15}{16}$ $2\frac{3}{16}$	6	6.10	10 3/4	13	7 16	3 3/4		2	5/8
1 15	6	7.30	11 1/2	13 3/4	7 16	3 3/4		2	5/8
$2\frac{3}{16}$	6	9.35	12 7/8	15 1/2	5/8	4 1/2		2	3/4
$2\frac{7}{16}$	6	10.65	12 7/8	$15\frac{1}{2}$	5/8	$4\frac{1}{2}$		2	3/4
2 11	$6\frac{1}{4}$	12.75	12 7/8	$15\frac{1}{2}$	5/8	4 1/2		2	3/4
$2\frac{15}{16}$	$8\frac{1}{2}$	15.50	13 1/8	16 1/4	5/8	6 1/2		2	7/8

"PIONEER" STEEL FRAMES ONLY DROP HANGERS

e	1	1	1				
Price	*F Inches	*L Inches	T Inches	W Inches	H Inches	No. of Bolts	Size Bolts Inch
No. 1." Frames	take bear	rings from	15 inch	to 1 15 i	nch incl	usive.	
3.65 3.65 4.05 4.80 5.65	$\begin{array}{ c c c c }\hline 10^{3}4\\ 10^{1}4\\ 12^{1}2\\ 14^{1}8\\ 17^{3}8\\ \end{array}$	$\begin{array}{c c} 13 \\ 12\frac{1}{2} \\ 15\frac{1}{4} \\ 16\frac{3}{4} \\ 20 \end{array}$	$ \begin{array}{c c} & 7 \\ & 16 \\ & 7 \\ & 16 \\ & 1/2 \\ & 1/2 \\ & 1/2 \\ & 1/2 \end{array} $	$3\frac{3}{4}$ $5\frac{1}{4}$ $5\frac{1}{2}$ $5\frac{1}{2}$ $5\frac{1}{2}$	3 1/16	2 2 2 2 4	5/8 5/8 5/8 5/8 5/8
No. 2." Frame ich for 22—24 a	s take bea	arings from	$n 2 \frac{3}{16}$ ir	ich to 2	11 inch	inclusiv	e, also
5.75 6.05 6.90 7.85 9.10 12.55	$\begin{array}{c c} 11 & 1/4 \\ 13 & 3/8 \\ 15 & 1/8 \\ 17 & 5/8 \\ 20 & \frac{3}{16} \\ 23 & \frac{7}{8} \end{array}$	$\begin{array}{ c c c }\hline 14\frac{1}{8} \\ 16\frac{1}{2} \\ 18 \\ 21 \\ 23\frac{5}{8} \\ 27\frac{7}{8} \\ \end{array}$	1/2 5/8 5/8 1/2 1/2 1/2	$5\frac{1}{2}$ $6\frac{1}{2}$ $6\frac{1}{2}$ $6\frac{1}{2}$ $6\frac{1}{2}$ $6\frac{1}{2}$ $6\frac{1}{2}$	4 4 4	2 2 2 4 4 4	3/4 3/4 3/4 5/8 5/8
Io. 2½." Fram	nes take be	earings fro	om $2\frac{3}{16}$ i		11 inch	inclusiv	re.
5.75	12 7/8	15 ½	5/8	4 1/2		2	3/4
lo. 3." Frames	take 2 15	inch bear	rings on	ly.			
				$7\frac{1}{2}$ $7\frac{1}{2}$ $7\frac{1}{2}$ $7\frac{1}{2}$ $7\frac{1}{2}$	4 4	$\begin{bmatrix} 2\\2\\4\\4 \end{bmatrix}$	7/8 7/8 3/4 3/4
o. 3½." Fram	es take 2 1	inch bea	rings onl	ly.			
7.50	$13\frac{1}{8}$	161/4	5/8	6 ½		2	7/8
o. 4." Frames	take bea	rings fron	n 3 3 to	3 15 in	ch inclus	sive, al	so 2 15/16
11.00 13.50 16.00 17.50 19.50	$\begin{array}{ c c c }\hline 17\frac{1}{8} \\ 18\frac{1}{2} \\ 20\frac{7}{8} \\ 23\frac{5}{8} \\ 24\frac{3}{4} \\ \end{array}$	$\begin{array}{c c} 25\frac{1}{2} \\ 27\frac{1}{2} \\ 30\frac{1}{8} \\ 32\frac{3}{8} \\ 34\frac{1}{4} \end{array}$	2 2 2 2 2	8 8 8 8		2 2 2 2 2	1 1 1 1
	3.65 3.65 4.05 4.80 5.65 5.75 6.05 6.90 7.85 9.10 12.55 6.02." Frame 7.50 7.50 9.00 11.00 12.55 9.00 11.00 12.55 9.00 11.00 12.55 9.00 11.00 12.55 9.00 11.00 12.55	Inches Inches	Inches Inches	Inches Inches	Inches Inches	Inches Inches	Inches Inches Inches Inches Inches Boits Inches Inches Inches Inches Inches Inches Inches Inches Inches Inches Inches Inches Inches Inches Inches Inches Inches Inches Inches Inches Inches Inches Inches Inches Inches Inches Inches Inches Inches Inches Inches Inches Inches Inches

^{*}These dimensions may vary slightly from those given.

"PIONEER" STEEL FRAMES ONLY POST HANGERS

Note.—"Pioneer" Post Hangers are identical with the smallest Drop Hangers of Frame Patterns No. 1, No. 1½, No. 2½, No. 3½.

Size of Shaft Inches	Frame Pattern	Reach "R" Inches	Price	*F Inches	*L Inches	T Inches	W Inches	No. of Bolts	Size Bolts Inch
$\begin{array}{c} \frac{15}{16} \\ 1\frac{3}{16} \\ 1\frac{7}{16} \\ 1\frac{1}{16} \\ 1\frac{1}{16} \\ 2\frac{3}{16} \\ 2\frac{7}{16} \\ 2\frac{1}{16} \\ 2\frac{1}{16} \\ 2\frac{1}{16} \\ \end{array}$	No. 1 No. 1 No. 1 No. 1 No. 1½ No. 2½ No. 2½ No. 2½ No. 3½	6 6 6 6 6 6 6 8 14 8	3.65 3.65 3.65 4.00 5.75 5.75 7.50	$\begin{array}{c} 10 \stackrel{3}{\cancel{4}}\\ 10 \stackrel{3}{\cancel{4}}\\ 10 \stackrel{3}{\cancel{4}}\\ 11 \stackrel{1}{\cancel{1}}\\ 2 12 \stackrel{7}{\cancel{8}}\\ 12 \stackrel{7}{\cancel{8}}\\ 12 \stackrel{7}{\cancel{8}}\\ 13 \stackrel{1}{\cancel{8}}\\ \end{array}$	13 13 13 13 13 14 15 15 15 12 15 12 16 14	7 16 7 16 7 16 7 16 7 16 5 8 8 8 8 8 8 8 8 8 8 8 8	3 3/4 3 3/4 3 3/4 3 3/4 4 1/2 4 1/2 4 1/2 6 1/2	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	5/8 5/8 5/8 5/8 5/8 3/4 3/4 7/4

B. & S. PILLOW BLOCK FRAMES ONLY

ARE FITTED WITH OUR REGULAR HANGER BEARINGS

"PATTERN No. 1" for bearings from $1\frac{3}{16}$ inch to 2 inch inclusive.

Price	A Inches	B Inches	C Inches	D Inches	E Inches	F Inches	No. of Bolts	Size of Bolts Inches
2.75	12 1/8	9 1/2	3 1/2	6 3/4	5/8	3 3/8	2	5/6

"PATTERN No. 2" for bearings from $2\frac{3}{16}$ inch to $2\frac{3}{4}$ inch inclusive.

Price	A Inches	B Inches	C Inches	D Inches	E Inches	F Inches	No. of Bolts	Size of Bolts Inches
3.40	14 1/4	11	4 1/4	73/4	7/6	3 1/2	2	3/4

"PATTERN No. 3" for $2\frac{15}{16}$ inch and 3 inch bearings.

Price	A Inches	B Inches	C Inches	D Inches	E Inches	F Inches	No. of Bolts	Size of Bolts Inches
5.55	14 1/2	11 1/8	51/4	8 3/4	1	5	2	74

^{*}These dimensions may vary slightly from those given,



"PIONEER" STEEL FRAMES ONLY WALL BRACKETS

Note.—"Pioneer" Wall Brackets are made up from "Pioneer" Drop Hanger Frames by equipping these with extra heavy Side Set Screws and are therefore special.

Size Shaft Inches	Reach "R" Inches	Price	*F Inches	*L Inches	T Inches	W Inches	H Inches	No. of Bolts	Size Bolts Inch
$ \begin{array}{c} \frac{15}{16} \\ \text{to} \\ 1\frac{11}{16} \\ \text{incl.} \end{array} $	$\begin{array}{c} 8\frac{1}{2} \\ 11\frac{1}{2} \\ 15\frac{1}{2} \\ 19\frac{1}{2} \end{array}$	4.15 4.55 5.55 6.65	$\begin{array}{c} 10\frac{1}{4} \\ 12\frac{1}{2} \\ 14\frac{1}{8} \\ 17\frac{3}{8} \end{array}$	$\begin{array}{c} 12 \frac{1}{2} \\ 15 \frac{1}{4} \\ 16 \frac{3}{4} \\ 20 \end{array}$	7 16 1/2 1/2 1/2 1/2	$ 5\frac{1}{4} $ $ 5\frac{1}{2} $ $ 5\frac{1}{2} $ $ 5\frac{1}{2} $ $ 5\frac{1}{2} $	$3\frac{1}{16}$	2 2 2 4	5/8 5/8 5/8 1/2
1 15 16	$\begin{array}{c} 8\frac{1}{2} \\ 11\frac{1}{2} \\ 15\frac{1}{2} \\ 19\frac{1}{2} \end{array}$	4.65 5.05 5.80 7.15	$\begin{array}{c} 11 \\ 13 \frac{1}{4} \\ 14 \frac{7}{8} \\ 18 \frac{1}{8} \end{array}$	$\begin{array}{c} 13\frac{1}{4} \\ 16 \\ 17\frac{1}{2} \\ 20\frac{3}{4} \end{array}$	$\frac{7}{16}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	$ 5\frac{1}{4} $ $ 5\frac{1}{2} $ $ 5\frac{1}{2} $ $ 5\frac{1}{2} $ $ 5\frac{1}{2} $	3 1/16	2 2 2 4	5/8 5/8 5/8 1/2
$2\frac{3}{16}$	$8\frac{1}{2}$ $11\frac{1}{2}$ $15\frac{1}{2}$ $19\frac{1}{2}$ $23\frac{1}{2}$	6.25 6.80 7.90 8.85 11.10	$\begin{array}{c} 11{}^{1}\!\!\!/_{4} \\ 13{}^{3}\!\!\!/_{8} \\ 15{}^{1}\!\!\!/_{8} \\ 17{}^{5}\!\!\!/_{8} \\ 20{}^{3}\!\!\!\!/_{16} \end{array}$	$14\frac{1}{8}$ $16\frac{1}{2}$ 18 21 $23\frac{5}{8}$	1/2 5/8 5/8 1/2 1/2	$ 5\frac{1}{2} $ $ 6\frac{1}{2} $	4 4	2 2 2 4 4	3/4 3/4 3/4 5/8 5/8
$2\frac{7}{16} \\ \text{and} \\ 2\frac{11}{16}$	$\begin{array}{c} 8\frac{1}{2} \\ 11\frac{1}{2} \\ 15\frac{1}{2} \\ 19\frac{1}{2} \\ 23\frac{1}{2} \end{array}$	6.75 7.05 8.90 9.85 12.10	$\begin{array}{c} 12\frac{1}{4} \\ 14\frac{3}{8} \\ 16\frac{1}{8} \\ 19 \\ 21\frac{3}{16} \end{array}$	$15\frac{1}{8}$ $17\frac{1}{2}$ 19 22 $24\frac{5}{8}$	1/2 5/8 5/8 1/2 1/2	$ \begin{array}{c} 5\frac{1}{2} \\ 6\frac{1}{2} \\ 6\frac{1}{2} \\ 6\frac{1}{2} \\ 6\frac{1}{2} \end{array} $	4 4	2 2 2 4 4	3/4 3/4 3/4 5/8 5/8
2 15 16	$11\frac{1}{2}$ $15\frac{1}{2}$ $19\frac{1}{2}$ $23\frac{1}{2}$	9.50 12.00 14.50 16.50	$\begin{array}{c} 15\frac{7}{16} \\ 17\frac{1}{8} \\ 20 \\ 23\frac{1}{4} \end{array}$	$\begin{array}{c} 19\frac{1}{16} \\ 20\frac{1}{8} \\ 24\frac{1}{16} \\ 26\frac{5}{8} \end{array}$	3/4 3/4 5/8 5/8	$ \begin{array}{c c} 7 \frac{1}{2} \\ 7 \frac{1}{2} \\ 7 \frac{1}{2} \\ 7 \frac{1}{2} \\ 7 \frac{1}{2} \end{array} $	4 4	2 2 4 4	7/8 7/8 3/4 3/4

^{*}These dimensions may vary slightly from those given.

"PIONEER" ADJUSTABLE PILLOW BLOCKS



PLATE 7951

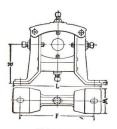


PLATE 7951A

Size Shaft Inches	R Inches	Price	*F Inches	*L Inches	T Inches	W Inches	H Inches	No. of Bolts	Size Bolts Inch
$1_{\frac{16}{16}}^{\frac{15}{16}}$ $1_{\frac{7}{16}}^{\frac{7}{16}}$	$ \begin{array}{r} 6 \frac{1}{4} - 7 \\ 6 \frac{1}{4} - 7 \\ 6 \frac{1}{4} - 7 \end{array} $	5.00 5.00 5.30	$\begin{array}{c} 10\frac{3}{4} \\ 10\frac{3}{4} \\ 10\frac{3}{4} \end{array}$	13 13 13	7 16 7 16 7 16 7 16 7	3 ³ ⁄ ₄ 3 ³ ⁄ ₄ 3 ³ ⁄ ₄		2 2	5/8 5/8
$\begin{array}{c} 1\frac{7}{16} \\ 1\frac{11}{16} \\ 1\frac{15}{16} \\ 2\frac{3}{16} \\ 2\frac{7}{16} \\ 2\frac{11}{16} \\ 2\frac{15}{16} \\ \end{array}$	$ 6\frac{1}{4}-7 $ $ 6\frac{3}{8}-7\frac{1}{8} $ $ 6\frac{1}{4}-6\frac{3}{4} $	6.10 6.95 9.35	$ \begin{array}{c} 10 \stackrel{3}{\cancel{3}} \stackrel{4}{\cancel{4}} \\ 10 \stackrel{3}{\cancel{3}} \stackrel{4}{\cancel{4}} \\ 12 \stackrel{7}{\cancel{8}} \\ 12 \stackrel{7}{\cancel{8}} \\ \end{array} $	13 13 15½		3 3/4 3 3/4 4 1/2		2 2 2	5/8 5/8
$2\frac{7}{16}$ $2\frac{11}{16}$ $2\frac{15}{16}$	$6\frac{1}{4} - 6\frac{1}{2}$ $6\frac{1}{2} - 7$ $7\frac{7}{8} - 9\frac{3}{4}$	$10.65 \\ 12.75 \\ 15.00$	$12\frac{7}{8}$ $12\frac{7}{8}$ $13\frac{1}{8}$	$15\frac{1}{2}$ $15\frac{1}{2}$ $16\frac{1}{4}$	5/8 5/8 5/8 5/8 5/8	4 ½ 4 ½ 6 ½		2 2 2 2	3/4 3/4 7/

[&]quot;Pioneer" Adjustable Pillow Block Frames are identical with the smallest Drop Hanger corresponding to shaft diameters listed above.

To convert a Drop Hanger into an Adjustable Pillow Block merely reverse the bearing. †When fitted with "Standard" Bearings.

^{*}These dimensions may vary slightly from these given.



BALL AND SOCKET HEADSHAFT HANGERS





PLATE 7955 EXTRA HEAVY

REGULAR HANGERS

Size of Shaft		Kang	ge of Drop, Inch	nes	
Inches	10 to 12	13 to 15	16 to 18	19 to 21	23 to 25
1 15	12.40	13.10	13.85	14.80	17.50
$1\frac{15}{16} \\ 2\frac{3}{16}$	13.40	14.10	14.85	15.80	18.50
$\frac{-16}{27}$	16.70	17.65	19.00	20.00	21.60
211	17.95	18.90	20.25	21.25	22.85
2 15	22.70	24.60	26.10	27.90	32.40
3 3	24.20	26.10	27.60	29.40	33.90
3 7	29.25	32.00	33.30	35.50	38.25
3 11	30.75	33.50	34.80	37.00	39.75
$2^{\frac{7}{16}}$ $2^{\frac{11}{16}}$ $2^{\frac{15}{16}}$ $2^{\frac{15}{16}}$ $2^{\frac{15}{16}}$ $2^{\frac{11}{16}}$ $2^{\frac{11}{16}}$ $2^{\frac{11}{16}}$ $2^{\frac{15}{17}}$ $2^{\frac{15}{17}}$	44.90	47.10	50.80	53.00	57.30
4 7	47.90	50.10	53.80	56.00	60.30

EXTRA HEAVY HANGERS

Size	Range of Drop, Inches										
of Shaft Inches	12	14	16	18	20	24					
$\begin{array}{c} 4 \ \frac{7}{16} \\ 4 \ \frac{1}{16} \\ 5 \ \frac{7}{16} \\ 5 \ \frac{1}{16} \\ 6 \ \frac{7}{16} \\ 6 \ \frac{1}{16} \\ \end{array}$	90.00 94.50 120.00 127.00 165.00 176.00	93.00 97.50 125.00 132.00 171.50 182.50	96.50 101.00 130.00 137.00 178.00 189.00	100.50 105.00 135.00 142.00 185.00 196.00	105.00 109.50 140.00 147.00 191.50 202.50	112.00 116.50 150.00 157.00 203.50 214.50					

BASE PLATES OR SHOES—For Headshaft Hangers

Shaft Size Inches	For Hangers with Drop Inches	Price 2 Inches Thick Each	Price 3 Inches Thick Each
$4\frac{7}{16}$ and $4\frac{15}{16}$	12, 14, 16, 18	32.50	39.00
	20, 24	45.50	54.60
$5\frac{7}{16}$ and $5\frac{15}{16}$	12, 14, 16, 18	41.00	49.20
	20, 24	57.40	68.90
$6\frac{7}{16}$ and $6\frac{15}{16}$	12, 14, 16, 18	50.00	60.00
	20, 24	70.00	84.00



ADJUSTABLE BALL AND SOCKET HANGERS DOUBLE BRACE AND RING OILING





PLATE 7956 REGULAR

PLATE 7957 PEERLESS

REGULAR HANGERS

Size of Shaft				Rang	e of Dr	op, Inch	nes			
Inches	8	10	12	14	16	18	20	24	30	36
$1\frac{3}{16}$	4.20	4.40	4.60	4.80	5.10	5.40	5.70			
$1_{\frac{7}{16}}$	5.50	5.90	6.30	6.70	7.10	7.50	8.00	9.00		
$1\frac{11}{16}$	6.00	6.40	6.80	7.20	7.60	8.00	8.50	9.50		
$1\frac{15}{16}$	7.25	7.80	8.40	9.00	9.60	10.20	11.00	12.00	14.65	
$2\frac{3}{16}$	8.00	8.55	9.15	9.75	10.35	10.95	11.75	12.75	15.40	
$2\frac{7}{16}$	11.40	12.00	12.60	13.25	14.00	14.80	15.80	17.50	19.10	22.8
2 11	12.40	13.00	13.60	14.25	15.00	15.80	16.80	18.50	20.10	23.8
2 15	15.25	16.00	16.80	17.60	18.40	19.50	21.00	23.00	26.00	30.0
$3\frac{\frac{3}{16}}{3\frac{7}{16}}$	16.50	17.25	18.05	18.85	19.65	20.75	22.25	24.25	27.25	31.2
$3\frac{7}{16}$		22.70	23.75	25.00	26.25	27.50	29.00	32.00	34.50	37.5
3 11		24.20	25.25	26.50	27.75	29.00	30.50	33.50	36.00	39.0
$3\frac{15}{16}$		30.00	31.00	32.00	33.50	35.50	37.50	40.00	43.00	48.0
4 7 16			46.50	49.00	51.00	53.00	56.00	60.00	65.00	72.0
4 15	Large		49.50	52.00	54.00	56.00	59.00	63.00	68.00	75.0

PEERLESS HANGERS

Size of Shaft			Range	of Drop,	Inches			
Inches	7 to 9	10 to 12	13 to 15	16 to 18	19 to 21	23 to 25	28 to 30	34 to 36
$1\frac{3}{16}$	4.20	4.50	4.80	5.30	5.70			
$\frac{1}{16}$	5.50	6.10	$\frac{6.70}{7.20}$	7.20	7.80 8 30	9.00		
$1 \frac{1}{16}$ $1 \frac{15}{16}$ $2 \frac{3}{16}$ $2 \frac{7}{16}$ $2 \frac{11}{16}$	7.25	8.25	9.00	9.50	10.40	11.40	14.65	
$2\frac{3}{16}$	8.00	9.00	9.75	10.25	11.15	12.15	15.40	
$\frac{2^{\frac{7}{16}}}{11}$	11.40 12.40	$12.40 \\ 13.40$	13.10 14.10	13.85	14.80	17.50 18.50	19.10 20.10	22.80 23:80
$2\frac{16}{15}$	15.00	16.70	17.65	14.85 19.00	15.80 20.00	21.60	24.65	29.15
$\frac{3}{3} \frac{3}{16} \\ 3 \frac{7}{16}$	16.25	17.95	18.90	20.25	21.25	22.85	25.90	30.40
$3\frac{7}{16}$		22.70	24.60	26.10	27.90	32.40	34.00	37.50
3 11 16 9 15		$24.20 \\ 29.25$	26.10	27.60	29.40	33.90	35.50	39.00
$3\frac{15}{16}$ $4\frac{7}{16}$		44.90	$\frac{32.00}{47.10}$	33.30 50.80	35.50 53.00	38.25 57.30	$\frac{40.30}{62.00}$	45.75 71.75
$4\frac{15}{16}$		47.90	50.10	53.80	56.00	60.30	65.00	74.75



RING OILING POST HANGERS DOUBLE BRACE, ADJUSTABLE





PLATE 7958 BALL AND SOCKET

PLATE 7959 PEERLESS

BALL AT	ND SC	CKET	POST	HAN	GERS		
Size of ShaftInches	1 3	1 7 16	1 11 16	1 15 16	$2\frac{3}{16}$	2 7/16	2 11/16
Priceeach	4.20	5.70	6.20	8.25	9.00	12.25	13.25
Size of ShaftInches	2 15 16	3 3 16	3 7/16	3 11 16	$3\frac{15}{16}$	4 7/16	4 15 16
Priceeach	16.50	17.75	24.10	25.60	32.75	49.00	52.00
PEE	RLES	S POS	T HAI	NGERS	3		
Size of ShaftInches	$1\frac{3}{16}$	$1\frac{7}{16}$	1 11 16	$1\frac{15}{16}$	$2\frac{3}{16}$	$2\frac{7}{16}$	$2\frac{11}{16}$
Priceeach	4.20	5.70	6.20	7.40	8.15	12.25	13.25
Size of ShaftInches	2 15 16	3 3 16	3 7/16	3 11 16	3 15 16	4 7/16	$4^{\frac{15}{16}}$
Priceeach	16.50	17.75	24.10	25.60	32.75	49.00	52.00

BALL AND SOCKET BRACKET HANGERS



PLATE 7960

Reach		Shaft Size, Inches										
Inches	1 7 16	1 116	$1\frac{15}{16}$	$2\frac{3}{16}$	$2\frac{7}{16}$	$2\frac{11}{16}$	$2\frac{15}{16}$	$3\frac{3}{16}$	$3\frac{7}{16}$	$3\frac{11}{16}$	$3\frac{15}{16}$	
10	7.20	7.70	9.50	10.25	14.40	15.40	19.50	20.75	24.10	25.60		
12	7.60	8.10	10.00	10.75	15.00	16.00	20.25			29.50	32.7	
14	8.00	8.50	10.50	11.25	15.60						37.0	
16	8.40	8.90	11.00	11.75	16.30	17.30	22.00	23.25	30.50	32.00	39.00	
18	8.90	9.40	11.75	12.50	17.00	18.00	23.00	24.25	32.00	33.50	41.00	
20			12.50	13.25	17.90	18.90	24.00	25.25	34.00	35.50	43.00	
24			13.60	14.35	21.00	22.00	26.00	27.25	38.00	39.50	46.00	

RIGID BEARINGS

BABBITT LINED

PLAIN



PLATE 7961 SOLID JOURNAL BOX

Size of ShaftInches	$\tfrac{15}{16}$	$1\frac{3}{16}$	$1\frac{7}{16}$	1 116	$1\frac{15}{16}$	$2\frac{3}{16}$	$2\frac{7}{16}$
Priceeach	.90	1.15	1.45	1.80	2.10	2.50	3.10
Size of ShaftInches	$2\frac{11}{16}$	2 15 16	3 3 16	3 7/16	3 11 16	$3\frac{15}{16}$	7 102
Priceeach	3.65	4.75	6.00	7.50	9.00	10.75	



PLATE 7962 PLAIN FLAT BOX



PLATE 7963 STANDARD PILLOW BLOCK

PLAIN FLAT BOXES

Size of Shaft Inches							
Priceeach	1.00	1.25	1.60	2.00	2.35	2.80	3.35
Size of ShaftInches	$2\frac{11}{16}$	$2\frac{15}{16}$	3 3 16	$3\frac{7}{16}$	3 11 16	$3\frac{15}{16}$	
Priceeach	4.00	5.00	6.25	7.75	9.50	11.75	

STANDARD PILLOW BLOCKS

Size of ShaftInches										
Price each	1.60	2.00	2.60	3.60	4.70	5.50	7.00	8.75	11.00	13.00
Size of ShaftInches	$3\frac{11}{16}$	$3\frac{15}{16}$	$4\frac{7}{16}$	$4\frac{15}{16}$	$5\frac{7}{16}$	$5\tfrac{15}{16}$	6 7 16	$6^{\frac{15}{16}}$	7 7 16	$7\frac{15}{16}$
Price each	14.50	16.00	21.00	27.50	34.00	42.00	50.00	60.00	70.00	80.00



RIGID BEARINGS

BABBITT LINED RING OILING



PLATE 7964 PILLOW BLOCK

Size of ShattInches	$1\frac{3}{16}$	$1\frac{7}{16}$	$1\frac{11}{16}$	$1\frac{15}{16}$	$2\frac{3}{16}$	$2\frac{7}{16}$	$2\frac{11}{16}$
Priceeach	4.00	4.75	5.40	6.00	7.00	8.25	9.75
Size of ShaftInches	$2\tfrac{15}{16}$	$3\frac{3}{16}$	$3\frac{7}{16}$	3 11 16	3 15 16	$4\frac{7}{16}$	4 15
Priceeach	12.00	13.50	16.50	19.00	23.00	30.00	40.00



PLATE 7965 EXTRA HEAVY PILLOW BLOCK

Size of ShaftInches	$2\frac{7}{16}$	$2\frac{11}{16}$	$2\frac{15}{16}$	$3\frac{3}{16}$	3 7/16	$3\frac{11}{16}$	3 15 16	$4\frac{7}{16}$
Price each	10.90	13.35	16.50	20.00	24.50	30.00	35.60	46.65
Size of ShaftInches	$4\frac{15}{16}$	$5\frac{7}{16}$	$5\frac{15}{16}$	$6\frac{7}{16}$	$6\frac{15}{16}$	$7\frac{7}{16}$	7 15 16	
Price each	60.00	73 50	89 00	104 50	120 00	135 50	150 00	

RING OILING PILLOW BLOCKS







PLATE 7967 PEERLESS

BALL AND SOCKET PILLOW BLOCKS

Size of ShaftInches	$1\frac{3}{16}$	$1_{\frac{7}{16}}$	1 11	1 15	2 3	127	2 11	2.25	1 3 3	1 3 7
Price each	4.20	5.90	6.40	7.00	7.75	10.75	$\frac{-16}{11.75}$	15.75	17.00	23 00
Size of ShaftInches	3 11 16	$3\frac{15}{16}$	4 7/16	4 15 16	$5\frac{7}{16}$	$5\frac{15}{16}$	6 7 16	6 15 16	$7\frac{7}{16}$	$7\frac{15}{16}$
Priceeach	24.50	32.50	46.00	49.00	64.00	69.00	90.00	96.00	126.00	133.00

PEERLESS PILLOW BLOCKS

Size of ShaftInches	$1\frac{3}{16}$	$1\frac{7}{16}$	1 11 16	1 1 15	$ 2\frac{3}{16} $	$ 2\frac{7}{16} $	2 11/16
Priceeach	3.60	5.30	5.80	6.40	7.15	10.85	11 85
Size of ShaftInches	$2\tfrac{15}{16}$	3 3 16	3 7/16	3 11 16	3 15 16	4 7/16	4 15
Priceeach	15.25	16.50	22.00	23.50	28.50	41.80	44.80

SAFETY SET COLLARS FINISHED ALL OVER, WITH COUNTERSUNK SET SCREWS



PLATE 7968 SOLID



PLATE 7969 SPLIT

Size of ShaftInches	$\frac{15}{16}$	$1\frac{3}{16}$	$1\frac{7}{16}$	1 11 16	$1\frac{15}{16}$	$2\frac{3}{16}$	$ 2\frac{7}{16} $	2 11 16	$2\frac{15}{16}$	3 3 16	$3\frac{7}{16}$
Price, solid each Price, split each	. 60	90	1 00	1 00	1 10	1 00	4 00				200
Size of ShaftInches	$3\frac{11}{16}$	3 15 16	4 7 16	4 15	$5\frac{7}{16}$	$5\frac{15}{16}$	6 7 16	$6\tfrac{15}{16}$	7 7 16	7 15	
Price, solid each Price, split each	3 30	2 60	1 70	5 00	7 90	0 00	10 10	11 50			



SHAFTING COUPLINGS



PLATE 7973
RIBBED COMPRESSION COUPLING



PLATE 7974 PLATE COUPLING

RIBBED COMPRESSION AND PLATE COUPLINGS

Size of ShaftInches	$1\frac{3}{16}$	1 7/16	1 11 16	1 15 16	$2\frac{3}{16}$	2 7/16	2 11/16	$2\frac{15}{16}$	$3\frac{3}{16}$	$3\frac{7}{16}$
Ribbedeach Plate, not fittedeach Plate for fittingeach		8 00	8 50	9 00	10.50	112.50	15.00	18.50	22.00	25.00
Size of ShaftInches	3 11 16	3 15 16	4 7 16	4 15 16	$5\frac{7}{16}$	$5\frac{15}{16}$	$6\frac{7}{16}$	$6\tfrac{15}{16}$	$7\frac{7}{16}$	$7\frac{15}{16}$
Ribbed each Plate, not fitted each Plate for fitting each	20 00	22 50	43 00	155 00	67 00	181 00	196.00	115.00	135.00	160.00



PLATE 7975 SHIFTING JAW CLUTCH COUPLING



PLATE 7976 RING COMPRESSION COUPLING

SHIFTING JAW CLUTCH COUPLINGS

Size of ShaftInches								
Not fittedeach For fittingeach	10.00 4.50	$11.00 \\ 5.00$	$13.00 \\ 5.50$	$14.50 \\ 6.00$	19.00 6.50	22.00 7.50	$\frac{28.00}{8.50}$	32.00 9.50
Size of ShaftInches	3 7/16	3 11 16	$3\frac{15}{16}$	$4\frac{7}{16}$	$4\frac{15}{16}$	$5\frac{7}{16}$	$5\tfrac{15}{16}$	
Not fitted each For fitting each	$\frac{38.00}{10.50}$	44.00 12.00	52.00 13.50	65.00 15.00	85.00 17.50	110.00 21.00	$140.00 \\ 25.00$	

RING COMPRESSION COUPLINGS

Size of ShaftInches	$1_{\frac{15}{16}}$	2 3 16	$2\frac{7}{16}$	2 11 16	$2^{\frac{15}{16}}$	$3\frac{3}{16}$	$3\frac{7}{16}$
Price each	9.00	10.25	11.75	14.00	17.50	21.00	24.00
Size of ShaftInches	$3\frac{11}{16}$	3 15 16	4 7 16	4 15 16	5 7/16	$5\frac{15}{16}$	
Priceeach	28.00	33.00	45.00	60.00	75.00	95.00	

SHAFTING COUPLINGS



PLATE 7977 SOLID SLEEVE COUPLING



PLATE 7978 UNIVERSAL GIANT COMPRESSION COUPLING

SOLID SLEEVE AND UNIVERSAL GIANT COMPRESSION COUPLINGS

Size of ShaftInches	15 16	$1\frac{3}{16}$	$1\frac{7}{16}$	1 11 16	$1\frac{15}{16}$	$2\frac{3}{16}$	$2\frac{7}{16}$	2 11/16	$2\frac{15}{16}$
Solid sleeve each Universal giant each	3.25	$\frac{3.50}{4.75}$	4.00 5.50	$\frac{4.50}{6.25}$	5.50 8.00	6.50 9.00	$7.50 \\ 10.75$	13.00	16.00



PLATE 7979
COLLINS' COMPRESSION COUPLING



PLATE 7980 DOUBLE CONE COMPRESSION COUPLING

COLLINS COMPRESSION COUPLINGS

Size of Shaft				Inches	1 16	1 16	1 13	2 3	2 16	216	2 15
Price				each	5.50	6.75	8.25	10.35	13.10	15.85	19.35
Size of Shaft				Inches	$3\frac{3}{16}$	3 7/16	$3\frac{11}{16}$	$3\frac{15}{16}$	$4\frac{7}{16}$	$4 \frac{15}{16}$	
Price				each	23.00	28.15	32.15	37.60	49.75	66.00	
DOUE	BLE	CON	E C	OMP	RESS	ION	COL	JPLII	NGS		
Size of ShaftInches	$1_{\frac{15}{16}}$	$2\frac{3}{16}$	$2\frac{7}{16}$	$2\frac{11}{16}$	$2\frac{15}{16}$	$3\frac{3}{16}$	$3\frac{7}{16}$	3 11 16	3 15 16	4 7/16	$4^{\frac{15}{16}}$
Priceeach	9.00	10.25	11.75	14.00	17.50	21.00	24.00	28.00	33.00	45.00	60.00
Size of Shaft	Inc	hes	5 7/16	$5\frac{15}{16}$	$6\frac{7}{16}$	6 15	7 1	6 7	15 16	8 7/16	$8\frac{15}{16}$
Price	e	ach 7	5.00	95.00	120.00	150.0	0 185.	00 225	5.00 27	70.00	320.00



UNIVERSAL GIANT FRICTION CLUTCHES

WITH EXTENDED SLEEVES FOR PULLEYS, GEARS, ROPE SHEAVES OR SPROCKETS



PLATE 7981

In the No. 14 and larger clutches the sleeves are made separate from the clutch. These sleeves are made in lengths to suit various pulley faces, and when bolted to place become a part of the clutch.

For sprockets or gears use sleeve for narrowest face pulley listed.

Quills and drums are bolted to clutch in same manner as sleeves.

The feature of making clutch so that it can be bolted to the article it drives is of especial advantage in that it can readily be adapted to special conditions, such as being embodied in the construction of machines of any description wherein clutch drives are required.

	Bores and ches	Diam.	er at M.	ut		I	Price w	ith Sle	eve for	Pulley		
ы	Libbe		owed P. 1	without		V	idth c	of Pulle	y Face	, Inche	S	
Number	Range of Bo in Clutch and Sleeve, Inche Outside Diar of Sleeve, In Horsepower 100 R. P. M Price withou Sleeve	Price v Sleeve	6	8	10	12	14	16	18	20		
16)	1 to 2 1/2 1 to 2 3 1/2 1 to 3 3 1/2 1 to 3 3 1/2 1 to 3 3 1/2 2 3 3 3 4 4 1/2 2 3 3 5 1/2 3 4 4 5 1/2 3 5 1/2 3 6 1/2 3 7 1/2 3 7 1/2 3 8 1/	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	20 20 20 20 20 25 25 25 25 25 25 24 34 34 34 34	47.50 47.50 47.50 60.00 60.00 60.00 60.00 60.00 75.00 75.00 75.00	57.75 59.00 60.25 61.50 70.75 72.00 73.25 74.75 76.25 77.75 88.75 90.25 91.75	58.55 59.85 61.15 62.50 71.50 72.80 74.15 75.75 79.00 88.30 89.65 91.25 92.85	59.35 60.70 62.05 63.50 72.25 73.60 75.05 76.75 78.45 80.25 89.10 90.55 92.25 93.95 93.95	61.55 62.95 64.50 73.00 74.40 75.95 77.75 79.55 81.50 89.90 91.45 93.25 95.05	59.50 60.95 62.45 63.85 65.50 73.75 75.20 76.85 78.75 80.65 82.75 90.95 94.25 96.15 98.25	60.50 62.00 63.50 65.00 66.75 74.75 78.00 80.00 82.00 84.25 92.00 93.50 95.00 97.50 99.75	68.00 75.75 78.35 79.20 81.25 83.50 85.75 93.10 94.70 96.75	62.50 64.20 65.74 67.40 69.25 76.76 79.44 82.50 84.00 87.25 94.20 95.90 98.00 100.50 100.50



UNIVERSAL GIANT FRICTION CLUTCHES

WITH EXTENDED SLEEVES FOR PULLEYS, SPROCKETS, GEARS, ETS.

•	Bores and ches	am.	r at A.	ut		Pr	ice, wit	h Sleev	e for P	ulley	
H	of E	e Di	P. I	Width of Pulley Face,				Face, I	nches		
Number	Range of Bore in Clutch and Sleeve, Inches	Outside Diam. of Sleeve Inches	Horsepower at 100 R. P. M.	Price without Sleeve	10	12	14	16	18	20	24
20	2 \frac{116}{6} \tan 3 \frac{14}{4} \\ 3 \frac{15}{6} \tan 3 \frac{3}{4} \\ 3 \frac{15}{6} \tan 3 \frac{3}{4} \\ 4 \frac{15}{6} \tan 4 \frac{3}{4} \\ 4 \frac{13}{6} \tan 5 \frac{14}{4} \\ 5 \frac{15}{6} \tan 5 \frac{3}{4} \\ 5 \frac{13}{6} \tan 6 \\ 2 \frac{16}{6} \tan 3 \frac{1}{4} \\ 2 \frac{16}{6} \tan 3 \frac{1}{4} \\ 3 \frac{15}{6} \tan 6 \\ 2 \frac{16}{6} \tan 3 \frac{1}{4} \\ 5 \frac{15}{6} \tan 6 \\ 2 \frac{15}{6} \tan 3 \frac{1}{4} \\ 6 \frac{1}{6} \tan 6 \\ 7 \frac{1}{6}	$\begin{array}{c} 5 \frac{7}{16} \\ 5 \frac{16}{16} \\ 6 \frac{15}{16} \\ 6 \frac{15}{16} \\ 7 \frac{15}{16} \\ 8 \frac{7}{16} \\ 5 \frac{16}{16} \\ 5 \frac{15}{16} \\ 6 \frac{15}{16} \\ \frac{15}$	45 45 45 45 45 45 45 55	95.00 95.00 95.00 95.00 95.00 95.00 120.00	113.50 114.00 116.00 118.00 119.50 121.50 137.00	$\begin{array}{c} 114.50 \\ 115.25 \\ 117.50 \\ 119.50 \\ 121.00 \\ 123.25 \\ 138.00 \end{array}$	113.90 115.50 116.50 119.00 121.00 122.50 125.00 138.90 140.50	116.75 118.00 120.50 122.50 124.00 126.75 139.95	113.00 119.50 122.00 124.00 125.75 128.75 141.25	119.25 120.00 124.00 126.00 127.50 130.75 142.45	$\begin{array}{c} 122.25 \\ 124.00 \\ 128.50 \\ 131.00 \\ 132.00 \\ 134.75 \\ 144.50 \end{array}$
22	3 \(\frac{5}{6}\) to 3 \(\frac{3}{4}\) 3 \(\frac{13}{13}\) to 4 \(\frac{1}{4}\) 4 \(\frac{15}{6}\) to 4 \(\frac{3}{4}\) 4 \(\frac{15}{16}\) to 5 \(\frac{1}{4}\) 5 \(\frac{16}{16}\) to 5 \(\frac{3}{4}\) 5 \(\frac{15}{16}\) to 6	$\begin{array}{c} 6 & 16 \\ 15 & 16 \\ 6 & 16 \\ 7 & 16 \\ 7 & 16 \\ 7 & 16 \end{array}$	55 55 55 55 55	120.00 120.00 120.00 120.00 120.00	139.00 140.50 142.50 144.50 146.50	140.25 142.50 144.50 146.00 148.25	141.50 144.00 146.00 147.50 150.00	143 : 00 145 : 50 147 : 50 149 : 00 151 : 75	144.50 147.00 149.00 150.75 153.75	145.00 149.00 151.00 152.50 155.75	149.00 153.50 156.00 157.00 159.75
24	2 \(\frac{1}{6}\) to 3 \(\frac{1}{2}\) 3 \(\frac{1}{6}\) to 4 \(\frac{1}{16}\) to 5 \(\frac{1}{2}\) to 5 \(\frac{1}{6}\) to 6 \(\frac{1}{6}\) to 6 \(\frac{1}{6}\) to 7 \(\frac{1}{6}\) to 7 \(\frac{1}{6}\) to 7 \(\frac{1}{6}\) to 7 \(\frac{1}{6}\)	$\begin{array}{c} 8 {}^{7}_{1656} \\ 5 {}^{1}_{1656} \\ 6 {}^{1}_{1656} \\ 6 {}^{1}_{1656} \\ 7 {}^{1}_{1656} \\ 8 {}^{1}_{156} \\ 8 {}^{1}_{17} \\ 9 {}^{1}_{156} \\ 6 {}^{1}_{166} \\ 7 $	65 65 65 65 65 65 65 65	150.00 150.00 150.00 150.00 150.00 150.00 150.00	172.00 174.00 177.00 180.00 183.00 186.00 189.00 192.00	173.75 176.00 179.00 181.50 184.75 188.00 191.25	172.00 174.50 177.50 180.50 183.00 186.50 190.00 193.50 197.00	176.00 179.00 182.00 184.50 188.50 192.00 195.50 199.50	177 . 50 180 . 50 183 . 50 186 . 25 190 . 25 194 . 25 198 . 25 202 . 00	178.00 182.50 185.50 188.00 192.25 196.50 200.75 205.00	182.00 187.00 190.50 192.50 196.50 201.00 205.75 211.00
28	3 \(\frac{7}{6}\) to 4 \\ 4 \(\frac{1}{6}\) to 4 \\ 4 \(\frac{1}{6}\) to 5 \\ 5 \(\frac{1}{6}\) to 6 \\ 6 \(\frac{1}{6}\) to 6 \\ 6 \(\frac{1}{6}\) to 6 \\ 7 \(\frac{1}{6}\) to 7 \\ 7 \(\frac{1}{6}\) to 7 \\ 7 \(\frac{1}{6}\) to 8 \\ 3 \(\frac{1}{6}\) to 4 \\ 3 \(\frac{1}{6}\) to 4 \\ 2 \\ 6 \(\frac{1}{6}\) to 8 \\ 6 \(\frac{1}{6}\) to 8 \\ 6 \(\frac{1}{6}\) to 4 \\ 6 \(\frac{1}{6}\) to 5 \\ 6 \(\frac{1}{6}\) to 8 \\ 6 \(\frac{1}{6}\) to 8 \\ 6 \(\frac{1}{6}\) to 8 \\ 6 \(\frac{1}{6}\) to 4 \\\ 6 \(\frac{1}{6}\) to 6 \\ 6 \(\frac{1}{6}\) to 8 \\ 6 \(\frac{1}	$\begin{array}{c} 6\overset{15}{16} \\ 7\overset{7}{16} \\ 7\overset{7}{16} \\ 8\overset{7}{16} \\ 8\overset{15}{16} \\ 9\overset{1}{16} \\ 9\overset{1}{16} \\ 9\overset{1}{16} \\ 10\overset{7}{16} \\ 10\overset{1}{16} \\ 7\overset{1}{16} \\ 7\overset{1}{$	85 85 85 85 85 85 85 85	180.00 180.00 180.00		210.00 213.00 216.00 220.00 225.00 232.50 239.00	208.50 211.50 214.50 218.00 222.50 227.50 235.00 242.00 252.00	213.00 216.00 220.00 225.00 230.00 237.50 245.00	214.50 217.75 222.00 227.25 232.50 240.00 248.00	216.50 219.50 224.00 229.50 235.00 243.00 251.00	221.50 224.00 228.00 234.00 240.00 249.00 260.00
32	4 \(\frac{9}{16}\) to 5 \(\frac{5}{16}\) to 5 \(\frac{1}{2}\) 5 \(\frac{9}{16}\) to 6 \(\frac{6}{16}\) to 6 \(\frac{1}{2}\) 6 \(\frac{9}{16}\) to 7 \(\frac{1}{2}\) 7 \(\frac{9}{16}\) to 8 \(\frac{8}{16}\) to 8 \(\frac{1}{2}\) 6 \(\frac{1}{2}\) to 8 \(\frac{8}{16}\) to 8 \(\frac{1}{2}\)	$\begin{array}{c} 8 \frac{16}{15} \\ 8 \frac{15}{16} \\ 9 \frac{7}{16} \\ 9 \frac{15}{16} \\ 10 \frac{7}{16} \\ 10 \frac{15}{16} \\ 11 \frac{7}{16} \\ 11 \frac{15}{16} \\ \end{array}$	120 120 120 120 120 120 120 120 120 120	230.00 230.00 230.00 230.00 230.00 230.00 230.00 230.00 230.00	• • • • • • • • • • • • • • • • • • • •			300.00 310.00 315.00 340.00	295.00 303.00 313.50 329.00 345.00	306.00 317.00 333.00 350.00	315.00 326.00 343.00 362.50
$^{36\mathrm{DD}}_{42\mathrm{DD}}$	8 \(\frac{9}{16}\) to 9 4 \(\frac{7}{16}\) to 9 4 \(\frac{15}{16}\) to 9 4 \(\frac{15}{16}\) to 10 3 \(\frac{15}{16}\) to 8 \(\frac{1}{2}\) 4 \(\frac{7}{16}\) to 9 4 \(\frac{15}{16}\) to 9 4 \(\frac{15}{16}\) to 9 4 \(\frac{15}{16}\) to 9 4 \(\frac{15}{16}\) to 10	12 76	150 180 240 240 300 360	230.00 300.00 450.00 750.00 400.00 500.00 900.00	of gr	Quills areater cal price	re recon capacity es will	nmende z than	d for us	se with	pulleys



UNIVERSAL GIANT FRICTION AND DUPLEX CLUTCHES

FRICTION CLUTCHES



PLATE 7982

No.	Standard Stock Clutches Will Bore Inches	Special Clutches Will Bore Inches	Standard Diam. of Sleeves and Bore of Pulley Inches	Standard Length of Sleeves Inches	Space Required on Shaft Inches	Horse- power at 100 R. P. M.	Price Including Yoke and Fulcrum
5	15 to 1½		$2\frac{7}{16}$	5 1/2	121/2	1 3/4	18.00 20.00
5 6 7 8 9	$1\frac{3}{16}$ to $1\frac{3}{4}$	1 13 40 93/	$2\frac{11}{16} \\ 3\frac{11}{16}$	$\frac{6\frac{1}{2}}{6\frac{1}{2}}$	$14\frac{1}{2}$ $14\frac{1}{2}$	3	24.75
7	1 7 to 2 1/4	$1\frac{13}{16}$ to $2\frac{3}{4}$	3 16	8 1/2	17 1/8	51/6	26.00
0	2553 8 =	2 5 to 3 1/4	$3\frac{3}{16}$ $4\frac{3}{16}$	81/2	177%	$\frac{5\frac{1}{2}}{5\frac{1}{2}}$	32.50
10	1 11 to 2 1/2	216 00 0 /4	3 1/2	11 1/4	21 7/8	10	36.00
10	116 00 2/2	$2\frac{9}{16}$ to 3	$\frac{3\frac{1}{2}}{3\frac{15}{16}}$	11 1/4	21 7/8	10	39.50
11		$3\frac{1}{16}$ to 4	5 3	11 1/4	21 7/8	10	44.00
12	$1\frac{15}{16}$ to $2\frac{1}{2}$		3 1/2	12 1/8	23 1/4	15	45.00
12		2 9 to 2 3/4	$3\frac{15}{16}$	12 1/2	23 5/8	15	49.50
12		2 13 to 3 14	$\begin{array}{c} 3 & 1 \\ 3 & 1 \\ 5 & 1 \\ 6 & 1 \\ 4 & 1 \\ 6 & 4 \\ 6 & 1 \\$	12 1/2	23 5/8	15	49.50 49.50
12	*******	$3\frac{5}{16}$ to $3\frac{3}{4}$ $3\frac{13}{16}$ to 4	4 15	12 1/2	23 5/8	15	49.50
12		$3\frac{13}{16}$ to 4	$5\frac{7}{16}$	$12\frac{1}{2}$	23 5/8	15	49.00

Clutches Nos. 5 to 12 inclusive, with sleeves of standard diameters and standard lengths, are stock sizes.

Special clutches are made to order with sleeves large enough in diameter to take shafts too large for standard diameter sleeves.

DUPLEX CLUTCHES



PLATE 7983

Duplex clutches, equipped to work together, are furnished at price of two separate clutches of same size.

UNIVERSAL GIANT CUT-OFF COUPLINGS

WITH FRICTION CLUTCHES



PLATE 7984

Number	Size of Shaft Equal to Capacity of Coupling Inches	Maximum Bore Inches	Horsepower at 100 R. P. M.	Price Including Yoke and Fulcrum
5	15 16	$\frac{1}{1}\frac{1}{2}\frac{1}{3}\frac{3}{4}$	13/4	18.00
6	$1\frac{3}{16}$	1 3/4	3	20.00
8	1 7	21/4	5 1/2	26.00
10	1 11	3	10	36.00
6 8 10 12	$1\frac{15}{16}$	4	15	45.00
14	$2\frac{3}{16}$	4 1/2	20	56.00
16	2 16	5	25	75.00
18	211	51/2	34	96.00
20	$2\frac{16}{16}$	4½ 5 5½ 6 6 7½ 8 8 9	45	120.00
22	3 3	6	55	150.00
21	3 7	71/2	65	180.00
24 28	3 15	8	85	220.00
32	4 7	81/2	120	275.00
36	1 16	9 2	150	350.00
32DD	5 7	81/6	240	450.00
36DD	5 15	8 1/2	300	550.00
42DD	6 7	91/2	360	750.00
42DD 48DD	6 15	10	480	1000.00

It is not a safe practice to use clutch couplings of smaller sizes than specified, unless it is known absolutely that the power to be transmitted from one shaft to the other is less than the capacity of coupling indicated. There is always a possibility of the power requirements being increased at some future time, either by putting more pulleys on the shafts or by increasing the length of the line.

In fitting the Universal Giant Coupling, the ends of shafts to be connected meet within the hub on the back of clutch. This makes a true male and female connection and insures absolute alignment of shafts.

A phosphor bronze bushing is provided to carry the end of extended shaft.



BUSHINGS

FOR SLEEVES OF UNIVERSAL GIANT FRICTION CLUTCHES

SIZES 5 INCHES TO 12 INCHES



PLATE 7985 PHOSPHOR-BRONZE



PLATE 7986 BRONZE GRAPHITE

PHOSPHOR-BRONZE AND BRONZE GRAPHITE BUSHINGS

PRICE PER PAIR, IN SLEEVE FOR PULLEY

				10		Siz	ze of S	haft, I	nches			
			$1\frac{3}{16}$	$1\frac{7}{16}$	$1\frac{11}{16}$	$1\frac{15}{16}$	$2\frac{3}{16}$	$2\frac{7}{16}$	$2\frac{11}{16}$	$2\frac{15}{16}$	3 3	3 7/16
Clutch	Length				Ou	itside l	l Diame	ter of I	l Bushin	gs, Inc	ehes	
No.	Inches	P. 33. B. G.	$\frac{1}{1}\frac{1}{16}$	$\begin{array}{c} 1_{\frac{15}{16}} \\ 1_{\frac{15}{16}} \end{array}$	$\begin{array}{c} 2\frac{3}{16} \\ 2\frac{3}{16} \end{array}$	$\begin{array}{c} 2\frac{7}{16} \\ 2\frac{7}{16} \end{array}$	$\begin{array}{c} 2\frac{11}{16} \\ 2\frac{11}{16} \end{array}$	$\begin{array}{c} 2\frac{15}{16} \\ 2\frac{15}{16} \end{array}$	$3\frac{3}{16} \ 3\frac{7}{16}$	$3\frac{7}{16} \\ 3\frac{11}{16}$	$3\frac{11}{16} \\ 3\frac{15}{16}$	$\begin{array}{c} 3\frac{15}{16} \\ 4\frac{3}{16} \end{array}$
5	21/4	Р. В.	2.40									
6	$\frac{2}{2}\frac{1}{4}$ $\frac{2}{3}\frac{3}{4}$	P. B.	2.40	5.40	7.50 9.60		****	6000 x x		x 2 5000	4 4 40404	a a 60
7	$2\frac{3}{4}$	B. G. P. B. B. G.	2.40 3.00	5.40	7.50			13.50 14.40			* * ****	
8	3 1/4	P. B. B. G.		9.90	10.20	14.10	14.70					
9	$3\frac{1}{4}$	P. B. B. G.		9.90	10.20	14.10	14.70	15.30 17.10	15.60	16.80	18.00	
10	$4\frac{1}{4}$	P. B. B. G.		15.00	15.50	16.20	17.40	18.00 19.80	18.60	18.90	19.80	21.3
11	4 1/4	P. B.		15.00	15.50	16.20	17.40	18.00 19.80	18.60	18.90	19.80	21.5
12	5 1/4	P. B. B. G.		3 2325	17.40	18.30	19.50	20.40 22.50	21.60	22.20	24.00	24.5

P. B.—Phosphor-Bronze.

Two bushings are used in each sleeve and are placed so as to be flush at each end, standing apart at center a sufficient distance to make an oil reservoir of ample size.

The phosphor-bronze bushings are equipped with the patent continuous spiral oil groove. In cutting the groove, the machine is set to allow the loop cut out at inside end of each bushing. These open ends will pull the oil into the groove, no matter in which direction sleeve is running.

Clutches running at high speed should have sleeves bushed. Regardless of speed, the life of a clutch will be prolonged considerably if sleeve is fitted with either of above bushings.

B. G.—Bronze Graphite.



BUSHINGS

FOR SLEEVES OF UNIVERSAL GIANT FRICTION CLUTCHES

SIZES 14 INCHES AND LARGER

PHOSPHOR-BRONZE BUSHINGS

PRICE PER PAIR, IN SLEEVE FOR PULLEY

	1	I			F	ace of	Pulle	y, Inc	hes			
Size of	Outside Diam.	6	8	10	12	14	16	18	20	22	24	30
Shaft Inches	of Bushings Inches	3 1/4	4 1/4	51/4	Len 6 1/4	gth of	Bushi 8 1/4	ings, I		11 1/4	121/4	151/4
1 1 1 6 3 1 7 1 6 1 1 6 5 6 3 1 7 1 6 1 1 6 5 6 7 1 6 5 6 6 3 1 7 1 6 1 1 6 5 6 7 1 6 5 6 7 1 6 5 6 7 1 6 7 1 6 5 6 7 1 6 7 1 6 5 6 7 1 6 7 1 6 5 6 7 1 6 7 1 6 5 6 7 1 6 7 1 6 7 1 6 7 1 6 5 6 7 1 6	22 2 3 3 3 4 4 4 5 5 5 6 6 6	14.70 15.30 15.60 16.80 18.00 19.50 21.00 28.50 30.00 31.50 33.50 34.50	17.40 18.00 18.60 18.90 19.80 21.30 22.80 31.50 32.50 33.00 35.00 36.60	19.50 20.40 21.60 22.20 24.00 24.90 27.00 33.00 35.00 36.00 39.50 41.10	23.40 24.00 24.90 25.50 27.00 27.90 30.60 36.60 37.50 39.00 41.50 42.90	29.10 30.00 30.90 31.80 34.50 40.50 42.00 42.60 44.00 45.00	29.10 30.00 30.90 32.70 33.60 34.50 43.50 46.50 48.00 49.50	35.10 36.00 37.50 38.10 39.00 41.10 46.50 50.00 52.20 53.50 54.90 59.40	37.50 38.40 41.70 43.50 44.10 45.00 50.70 53.50 55.50 58.50 64.50	44.40 50.40 52.50 57.00 61.50 64.50 69.00 70.50 73.50	70.00 70.50 74.00 75.00 81.00	84.00 87.00 88.50 91.50 93.00

BRONZE GRAPHITE BUSHINGS

PRICF PER PAIR, IN SLEEVE FOR PULLEY

		1			Fa	ice of l	Pulley	, Inch	es				
Size of	Outside Diameter	6	8	10	12	14	16	18	20	22	24	30	
Shaft Inches	of Bushings		1	1	Lei		th of Bushings, Inches						
	Inches	3 1/4	4 1/4	51/4	61/4	71/4	81/4	91/4	10 1/4	111/4	121/4	151/4	
1 15	2 7/6	15.60	18.00	20.40	24.00	28.80	31.20						
	2 11 16	16.20	19.20	21.60	25.20	29.40	32.40					* * * *	
$\begin{array}{c} 2\frac{3}{16} \\ 2\frac{7}{16} \\ 2\frac{1}{16} \\ 2\frac{1}{16} \\ 3\frac{3}{16} \\ 3\frac{7}{16} \\ 3\frac{1}{16} \\ 3\frac{1}{16} \\ 4\frac{3}{16} \\ 4\frac{7}{16} \end{array}$	$2\frac{15}{16}$												
2 11	$3\frac{7}{16}$												
2 16	$\frac{3\frac{11}{16}}{3\frac{15}{16}}$												
9 7	$4\frac{\frac{3}{16}}{4\frac{3}{16}}$												
3 11				33.60									
3 15	4 11 16	31 80	33 00	36.00	40 80	45.00	48.00	54.00	64.50	70.80	76.50		
$4\frac{3}{16}$	4 15	33.00	34.50	38.00	42.00	46.50	50.00	56.00	66.00	72.50	78.50	95.	
$4\frac{7}{16}$	$5\frac{3}{16}$			40.50									
4 11		37.00											
$4\frac{15}{16}$ $5\frac{7}{16}$	5 15	39.00	41.40	12.60	16.80	51.60	55.20	60.60	72.00	79.20	90.00		
5 16	$6\frac{7}{16}$	energy v					75.00	18.00	87.00	93.60	$108.00 \\ 112.50$	191 6	
$5\frac{15}{16}$	$6\frac{15}{16}$	K * * * *	becker				01.00	101.00	95.00	30.40	1114.00	141.2	



STEEL SHAFTING

ROUNDS ACCURATELY STRAIGHTENED

Sizes Inches	Estimated Weight per Foot	Prices per Pound	Sizes Inches	Estimated Weight per Foot	Prices per Pound
3 11/4 6 16 / S 7 16 / S 9 16 / S 116 / 4 15 6 / S 116 / S	.095	.07 1/2	2 1 1 6 2 1 1 1 6 2 1 1 1 6 2 1 1 1 6 2 1 1 1 6 2 1 1 1 6 2 1 1 1 1	17.55	.05
1/4	.167	$.06\frac{1}{2}$	2 5/8	18.32	05
5 16	.259	$.06\frac{1}{2}$	$2\frac{11}{16}$	19.31	.05
3/8	.376	$.06\frac{1}{2}$	2 3/4	20.18	.05
716	. 510	.06	$2\frac{13}{16}$	21.15	.05
1/2	. 666	.06	$2\frac{7}{8}$	22 09	.05
9 16	. ა43	.06	$2\frac{15}{16}$	22.96	.05
5/8	1.05	.053/4	3	24.06	.05
11	1.25	.05 3/4	$3\frac{1}{16}$	25.07	$.05\frac{1}{2}$
3/4	1.50	$.05\frac{1}{2}$	$3\frac{1}{8}$	26.09	$.05\frac{1}{2}$
13	1.757	$05\frac{1}{2}$ $05\frac{1}{2}$	$3\frac{3}{16}$	27.16	$.05\frac{1}{2}$
7/8	2.03	.051/2	$3\frac{1}{4}$	28.24	$.05\frac{1}{2}$
15 16	2.34	.05 1/2	$ \begin{array}{c} 3 \\ 3 \\ \hline{16} \\ 3 \\ 8 \\ 3 \\ \hline{36} \\ 4 \\ 3 \\ 5 \\ \hline{16} \\ 9 \\ 3 \\ 3 \end{array} $	29.40	$.05\frac{1}{2}$
1	2.66	.051/2	3 3/8	30.43	$.05\frac{1}{2}$
$1\frac{1}{16}$ $1\frac{1}{8}$ $1\frac{3}{16}$	3.00	.051/2	$3\frac{7}{16}$	31.50	$.05\frac{1}{2}$
1 1/8	3.36	.05 1/2	$3\frac{1}{2}$	32.64	.0534
$1\frac{3}{16}$	3.75	$.05\frac{1}{2}$	$3\frac{9}{16}$	33.84	.0534
1 1/4	4.16	.051/2	3.87-16/2.16/2.16/2.16/2.16/2.16/2.16/2.16/2.	35.20	.0534
$1\frac{5}{16}$	4.61	.051/2	$3\frac{11}{16}$	36.40	$.05\frac{3}{4}$
1 3/8	5.048	$.05\frac{1}{2}$	3 3/4	37.45	. 05 3/4
$\frac{1}{1}\frac{3}{8}$	5.50	.051/2	$\frac{378}{3\frac{15}{16}}$	39.85	.05 34
$1\frac{1}{2}$	6.00	.051/4	3 15 16	41.40	.0534
1 16	6.52	.051/4	4	42.66	.06
15/8	7.04	.051/4	$4\frac{3}{16}$	47.40	.06
1 116	7.60	.051/4	4 1/4	48.26	.06
1 3/4	8.16	.051/4	$4\frac{7}{16}$	52.62	.06
$egin{array}{c} 1 \ 1 \ 2 \ 1 \ 16 \ 1 \ 5 \ 8 \ 1 \ 16 \ 1 \ 3 \ 4 \ 1 \ 16 \ 1 \ 7 \ 8 \ 1 \ 16 \ 1 \ 16 \ 1 \ 16 \ 1 \ 16 \ 1 \ 1$	8.78	.051/4	$\begin{array}{c} 4 \ \frac{3}{16} \\ 4 \ \frac{1}{4} \\ 4 \ \frac{7}{16} \\ 4 \ \frac{1}{2} \\ 4 \ \frac{3}{4} \\ 4 \ \frac{15}{16} \\ 5 \end{array}$	54.11	.06 1/2
1 1/8	9.39	.05 1/4	4 3/4	60.88	.06 1/2
1 15	10.00	.051/4	4 15	65.50	.06 1/2
2	10.65	.05	5	67.50	.07
$2\frac{1}{16}$	11.15	.05	5 1/4	73.58	.07
21/8	12.07	.05	$5\frac{7}{16}$	78.89	.07
$2\frac{3}{16}$	12.79	.05	5 1/2	80.72	.0734
21/4	13.49	.05	5 3/4	88.24	.0734
$2\frac{5}{16}$	14.28	.05	$ 5 \frac{1}{4} 5 \frac{7}{16} 5 \frac{1}{2} 5 \frac{3}{4} 5 \frac{15}{16} $	94.12	.0734
23/8	15.07	.05	6	96.25	.08 1/2
$\begin{array}{c} 1^{\frac{15}{16}} \\ 2^{\frac{1}{16}} \\ 2^{\frac{1}{16}} \\ 2^{\frac{3}{16}} $	15.83	.05	Largo	r Sizes on Appli	cation
2 1/2	16.68	.05	Large	i bizes on Appn	Carololl.

NET EXTRAS FOR SHORT AND LONG LENGTHS

6 inches to 11 3/4 inches long	.00½ per lb. net, extra
3 inches to 5\(^3\)4 inches long	.01 per lb. net, extra
Shorter than 3 inches a special price will be quoted upon app	lication.
Over 24 feet and less than 30 feet	.00 1/2 per lb. net, extra
30 feet and less than 35 feet	.01 per lb. net. extra
35 feet and less than 40 feet	.01 ½ per lb. net, extra
40 feet and less than 45 feet	.02 per lb. net, extra
45 feet and over	

PUMP AND PISTON RODS

 $\frac{1}{2}$ cent per lb. Net extra above same size and length of shafting. Boxing at Cost.

STEEL SHAFTING

KEYSEATING SHAFTING

	Price	Price For		Price, Mid	dle Spindles	
Diameter of Shaft Inches	Full Length Per Foot	Couplings Milled Ends Per End	First Foot or Less Milled Ends	Second Foot and Over Per Foot	Extra for Drilled Ends Each	Extra for Squared End Each
1 \frac{1}{16} \to 1 \frac{1}{8} 1 \frac{3}{16} \to 1 \frac{3}{8} 1 \frac{7}{16} \to 1 \frac{3}{4}	.16 .20 .24	.24 .30 .40	.50 .60 .70	.16 .20 .24	.20 .30 .40	.30 .40 .50
$\begin{array}{c} 1\frac{16}{16} \text{ to } 2\frac{1}{8} \\ 2\frac{3}{16} \text{ to } 2\frac{3}{4} \\ 2\frac{13}{16} \text{ to } 3\frac{3}{8} \end{array}$.30 .40 .50	.50 .60 .80	.80 .90 1.10	.30 .40 .50	.50 .60 .70	.60 .70 .80
3 \frac{7}{16} \to 3 \frac{7}{8} 3 \frac{15}{16} \to 4 \frac{1}{4} 4 \frac{5}{16} \to 4 \frac{3}{4}	.60 .70 .90	$1.00 \\ 1.20 \\ 1.40$	1.30 1.50 1.70	.60 .70 .90	.80 .90 1.00	$1.00 \\ 1.20 \\ 1.30$
4 \frac{13}{16} \to 5 \frac{1}{4} \\ 5 \frac{5}{16} \to 5 \frac{3}{4} \\ 5 \frac{13}{16} \to 6 \\ 6 \frac{7}{16} \to 7	$egin{array}{c} 1.20 \ 1.50 \ 2.00 \ 2.25 \ \end{array}$	1.70 2.00 2.50 2.75	2.20 2.50 3.00 3.25	1.20 1.50 2.00 2.25	1.10 1.30 1.50 1.80	$1.50 \\ 1.70 \\ 2.00 \\ 2.30$

NET EXTRAS FOR CENTERING SHAFTING

DiameterInches	½ to ¾	13/16 to 11/4	$1\frac{5}{16}$ to $2\frac{1}{4}$	$2\frac{5}{16}$ to 4	4 1/16 to 6
6 to 12 inches long per lb. $12\frac{1}{8}$ to 24 inches long per lb. $24\frac{1}{8}$ inches and longer per lb.	.01 1/2	$.01\frac{1}{2}$ $.01$ $.00\frac{3}{4}$.01 .00 ³ / ₄ .00 ¹ / ₂	$00\frac{34}{12}$ $00\frac{1}{2}$ $00\frac{3}{10}$	$.00\frac{1}{2}$ $.00\frac{3}{10}$ $.00\frac{1}{10}$

COLD-ROLLED STEEL FLATS

FOR KEYS, FINGER BARS, KNIFE BACKS, ENGINE GUIDES, ELEVATOR SLIDES, ETC.

					Width	n, Inche	es				
Thickness Inches	1/2	9 to 23 3 3 2	3/4 to 1	$1\frac{1}{16}$ to $1\frac{1}{2}$	$1\frac{9}{16}$ to $1\frac{3}{4}$	$\frac{1\frac{13}{16}}{2}$ to	$2\frac{1}{16}$ to $2\frac{1}{4}$	$2\frac{5}{16}$ to $2\frac{1}{2}$	$2\frac{9}{16}$ to $2\frac{3}{4}$	$2\frac{13}{16}$ to 3	$3\frac{1}{16}$ to $3\frac{1}{2}$
$\frac{3}{16}$ to $\frac{5}{16}$ 3% to $\frac{7}{16}$.14	.14	.10	.10	.08	.08					
		.10	.08	.10	.08	.08	.08	.08	.08	.08	.10
½ to 9 5/8 to 11 3/4 to 15 16		.10	.08	.08	.08	.08	.08	.08	.08	.08	.10 .10
$\begin{array}{cccccccccccccccccccccccccccccccccccc$.08	.08	.08	.08	.08	.08	.08	.10 .10
$\begin{array}{cccccccccccccccccccccccccccccccccccc$.08	.08	.08	.08	.08	.10
$2\frac{1}{4}$ to $2\frac{1}{16}$.08	.08	.08	.10
2 34 to 2 16									.00	.08	.10

The above prices are for bars 5 to 24 feet long, inclusive.

FLATS IN SHORT LENGTHS

3 to $5\frac{15}{16}$ inches long	net extra per pound	.02
6 to $11\frac{15}{16}$ inches long	.net extra per pound	.01
12 to $23\frac{15}{16}$ inches long	.net extra per pound	.00 1/2
24 to 59 15 inches long	net extra per pound	.00 1/4

RELIANCE BELTS

DIRECTIONS FOR ORDERING. ETC.

Too much care cannot be given to getting the right belt for the right drive. this in view we here show all ordinary types of drives. We would ask that on making up your orders you state the type of drive on which the belt is to be used, also whether it is norizontal, vertical or inclined.

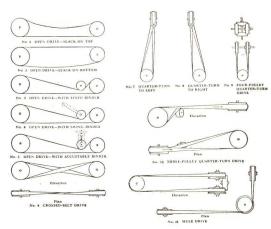


PLATE 8093

Also we should have the following information in picking you the most efficient belt:

- Diameter and width of driving pulley? 1. Diameter and width of driven pulley?
- Distance center to center of shafts?
- What does the belt drive? 4. Revolutions per minute of receiving pulley?
- Maximum and minimum horse power the belt is expected to drive. 6.
- State if any special conditions exist, such as hand or automatic shippers, idler.
- flange pulleys, taper cone pulleys, step cone pulleys?

8. Is belt subject to heat, dampness, steam, oil or acid fumes? Also state if the belt is to be made endless and if so if measurements given is exact steel tape measurement.

RELIANCE LEATHER BELTING

RELIANCE SINGLES. Are manufactured from heavy center stock, tanned with pure oak bark by the slow, old-fashioned process. It is a strictly short lap belt, no strips cut over four feet long and each width of belt is taken from a fixed location in the choice section of the belt. Thus insuring absolutely uniform and perfectly balanced belting.

RELIANCE SINGLES are also made in extra heavy weights.

Manufactured from the same stock as RELIANCE RELIANCE DOUBLE. SINGLE. Is absolutely short lap. Particular attention is given to the cementing of our double belts which is done only with the best of cement under enormous pressure. Also made in LIGHT and Extra HEAVY DOUBLES.

RELIANCE WATERPROOF. Is manufactured in both SINGLE and DOUBLE. It is of the same quality as our other Reliance Brands, but is treated in such a manner to make it absolutely water proof. It will also stand a very high degree of heat. being used for damp and wet places it is recommended as a high speed belt for small pulleys or a main drive under abnormal speed or load.

LEATHER BELTING



PLATE 5463

PRICE PER RUNNING FOOT

ADOPTED BY LEATHER BELTING MANUFACTURERS ASSOCIATION, NOVEMBER 21, 1908

½ in	.12	12 in	2.88	50 in 12.00
5% in	.15	13 in	3.12	52 in 12.48
34 in	18	14 in	3.36	54 in 12.96
7/8 in	21	15 in	3.60	56 in 13.44
	24	16 in	3.84	60 in 14.40
1 in	.30	17 in	4.08	64 in 15.36
1 ¼ in	.36	18 in	4.32	68 in 16.32
$1\frac{1}{2}$ in	.42		4.56	72 in 17.28
1 3/4 in		20 20011111111111111	4.80	72 m 11.20
2 in	.48		5.04	SOLID ROUND
2 1/4 in	.54	21 in		
$2\frac{1}{2}$ in	.60	22 in	5.28	½ in
2 3/4 in	.66	23 in	5.52	$\frac{3}{16}$ in
3 in	.72	24 in	5.76	½ in
3 ¼ in	.78	25 in	6.00	$\frac{5}{16}$ in
3 ½ in	.84	26 in	6.24	3/8 in18
3 ¾ in	.90	28 in	6.48	
4 in	.96	29 in	6.96	ROUND TWIST
4½ in	1.08	30 in	7.20	½ in
5 in	1.20	32 in	7.68	$\frac{3}{16}$ in
5½ in	1.32	34 in	8.16	¹ / ₄ in
	1.44	36 in	8.64	$\frac{5}{16}$ in
	1.56	38 in	9.12	3/8 in
$6\frac{1}{2}$ in	1.68	40 in	9.60	½ in
7 in	1.92	42 in	10.08	5/8 in
8 in	2.16	44 in	10.56	³ / ₄ in
9 in		46 in	11.04	
10 in	2.40		11.52	
11 in	2.64	48 in	11,04	1 in

Double Belts, twice the price of single. Intermediate Widths at proportionate.

CUT LACING



PLATE 5464

SizeInches	1/4	16	3/8	16	1/2	5/8	3/4
Per Bundle of 100 feet	2.50	3.00	3.75	4.50	5.50	6.50	7.50

Rawhide and Indian Tanned

LACE LEATHER SIDES

Rawhide.....per square foot ...



RUBBER TRANSMISSION BELTS

TYPES

RUBBER COVERED AND FRICTION SURFACE are the two distinctive styles of cover, one a heavy outer covering of rubber, the other a rubber friction thoroughly permeating all duck plies.

STITCHED AND RUBBER COVERED. Where varying loads or speeds produce whipping or unusual strains, belts are sometimes stitched as a precaution against ply separation. This produces a strong, but more or less rigid union between the plies. To maintain elastic adhesion without this rigidity belts are also made with super quality rubber friction between the plies. This construction is very flexible and hug pulleys closely.



PLATE 8018



A stitched rubber covered belt of great strength and durability. Is built of heavy duck and a high grade of rubber friction and with a rubber cover that makes it impervious to all water or moist conditions.

"Titan" will give excellent satisfaction in any but the most abnormal conditions.



A rubber covered belt of low cost, but designed for the harder types of light service. Not stitched. Gulf is an inexpensive, but very efficient belt.



RUBBER TRANSMISSION BELTS





PLATE 8015

A very heavy friction surface belt designed for the hardest transmission service. The outer ply is underlaid with an extra gum cushion which not only lessens shocks and strains, but also excludes moisture.

"Pacific" is practically non-stretchable and, therefore, is particularly recommended for endless belts.



DEFIANCE

THE DIAMOND - RUBBER CO.
AKRON, OHIO.

PLATE 8016

A high speed small pulley, friction surface belt specially designed for heavy duty. The distinctive feature is the special gum cushion between all plies.

"Defiance"-for abnormal pulley conditions and heavy service cannot be excelled.





PLATE 8017

A Friction Surface Belt for normal conditions constructed with extra quality rubber friction, thereby eliminating ply separation.

"Grip-tite" combines minimum stretch with unusual flexibility. It hugs the pulleys tightly—won't slip—and transmits power at a low cost.

RUBBER BELTING



PLATE 5420

Inch	2-ply	3-ply	4-ply	5-ply	6-ply	7-ply	8-ply
1	.09	.11	.13				
1 1/4	.11	.13	.16	TOTAL SERVICE	2		2 2 2 2 2 2
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	13	.15	.19	.23	11111111111	3 7 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	
1 3/	.15 .18	.17	22	.27			
2 4	18	.20	25	.31	.37		
214	.22	.25	.25 .31	.01	.46		
272	.26		.01	.38 .45			
9.17	.20	.30	.37	.45	.55		
3 1/2	.30	.35	.43	.53	.65		
4 ½ 4 ½ 5 6 7 8 9	.34	.40	.50 .55	.61	.75	.86	
4/2	.38	.45	.55	.69	.84	.96	
5	.42 .50	.50	.61 .72	.76	.91	1.06	
6	.50	.60	.72	.89	1.08	1.25	1.44
7	.59	.70	.84	1.04	1.25	1.46	1.68
8	.67	.80	.96	1.19	1.44	1.68	1.92
9	.76	.90	1.07	1.34	1.60	1.88	2.16
10	.84	1.00	1.20	1.49	1.77	2.09	2.40
11	.92	1.10	1.32	1.63	1.96	2.29	2.62
12	1.00	1.20	1.43	1.78	2.15	2.50	2.85
13	1.10	1.30	1.56				
14				1.95	2.34	2.73	3.12
	1.19	1.40	1.69	2.11	2.54	2.96	3.39
15	1.28	1.52	1.83	2.28	2.74	3.19	3.65
16	1.37	1.65	1.96	2.44	2.94	3.42	3.92
18	1.55	1.87	2.22	2.77	3.33	3.88	4.44
20	1.74	2.09	2.49	3.10	3.73	4.35	4.97
22	1.94	2.33	2.77	3.47	4,16	4.85	5.54
24	2.16	2.60	3.08	3.85	4.62	5.39	6.16
26	2.38	2.86	3.39	4.23	5.08	5.93	6.78
28	2 60	3 12	3.70	4.62	5.54	6.47	7.39
30	2.82	3.39	4.00	5.00	6.00	7.00	8.00
32	3.04	3.65	4.31	5.39	6.47	7.55	8.62
34	3.26	3.92	4.62	5.78	6.93	8.09	9.24
36	3.48	4.18	4.93	6.16	7.39	8.62	9.86
38	3.70	4.44	5.24	0.10	7.59		10.47
40				6.55	7.85	9.16	
	3.92	4.71	5.55	6.93	8.32	9.70	11.09
42	4.14	4.97	5.85	7.32	8.78	10.24	11.70
44	4.36	5.24	6.16	7.70	9.24	10.78	12.32
46	4.58	5.50	6.47	8.08	9.70	11.32	12.94
48	4.80	5 76	6.73	8.47	10.16	11.86	13.55
50	5.02	6.03	7.08	8.85	10.63	12.40	14.17
52	5.22	6.29	7.39	9.24	11.09	12.94	14.78
54	5 46	6.56	7.70	9.63	11.55	13.48	15.40
56	5.68	6.82	8.01	10.01	12.01	14.01	16.02
58	5.90	7.08	8.32	10.40	12.47	14.55	16.63
60							

RUBBER CONVEYOR BELTS

CUSHION EDGE REINFORCED CENTER SPECIAL SERVICE



PLATE 8019



PLATE 8020



PLATE 8021



Conveyor belts are made with cushion edge to resist abrasions by side guides and idlers with reinforced center where hard, heavy abrasive materials are to be handled and for special service.

The rubber covers are specially compounded to resist the action of acids, salts, and hot materials.



Designed for service where belt must not only lift heavy loads, but also dredge off the bottom. It withstands the hard usage of handling ore. Has a thick rubber cover on both sides of the belt which amply protects the duck plies beneath.

Due to its unusual tensile strength, "Portage" successfully withstands the tearing action of the buckets.

SPECIAL BELTS

We are prepared to furnish any belt for special work that may require a construction that is not regular. In fact there is nothing in the way of rubber belting or rubber bands that we are not prepared to furnish. If you are considering anything of this kind let us know and we will be pleased to advise.

STITCHED CANVAS BELTING



PLATE 8092

Adopted by the Canvas Stitched Belt Manufacturers Association.

EFFECTIVE OCT. 1ST, 1912

$rac{ ext{Width}}{ ext{Inch}}$	4-ply	5-ply	6-ply	8-ply	10-ply
1 1 1/2 2 1/2 3 1/2 4 4 1/2 5 6 6 7 7 8 9 10 111 123 134 145 16 168 20 222 24 228 330 332 334 336 338 440 442 444 446 48	.12 .18 .24 .30 .35 .39 .43 .47 .51 .60 .90 .90 .100 1,10 1.20 1.43 1.54 1.65 1.76 2.20 2.42 2.64 3.12 3.36 3.60 3.84 4.94 5.72 5.98 6.72 5.98 6.72 5.98 6.72 5.98 6.72 5.98 6.72 5.98 6.72 5.98 6.72 5.72 5.98 6.72 6.72 6.72 6.72 6.72 6.72 6.72 6.72	.30 .38 .38 .44 .49 .59 .64 .75 .88 1.00 1.13 1.25 1.38 1.50 1.79 1.93 2.06 2.20 2.48 2.75 3.03 3.30 4.20 4.50 4.50 6.18 6.53 6.83 7.15 6.83 7.15 7.48 7.80			3.00 3.58 3.85 4.13 4.40 4.95 5.50 6.60 7.80 8.40 9.00 9.60 10.20 10.80 12.35 13.00 13.65 14.30 14.95

Charge for Splice on Endless Belts. All belts 12 inches wide or under, three feet is the minimum charge. Belts over 12 inches wide, the charge is to be the equivalent of three times the width of the belt.



SOLID COTTON BELTING



PLATE 7649

		F 16.	ATE 7649				
Width, Inches	2-Ply	3-Ply	4-Ply	5-Ply	6-Ply	8-Ply	10-Ply
1	.04 .04 ½ .05	$.06$ $.06\frac{1}{2}$ $.07\frac{1}{2}$.09 .10 .11	.15 .16 .18	.20 .22 .24		
$1\frac{3}{4}$	$05\frac{1}{2}$ 06 $07\frac{1}{2}$ $08\frac{1}{2}$	$.08\frac{1}{2}$ $.09\frac{1}{2}$ $.11$ $.13$.12 .13 .15 .18	.19 .21 .23 .26	.29 .30 .32 .34	.36 .38 .41	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$.10$ $.11\frac{1}{2}$ $.13$ $.14\frac{1}{2}$.15 .17 .19 .21	.20 .23 .26 .28	.29 .31 .33 .36	.36 .38 .41 .44	.45 .50 .55 .58	
5½. 6 7 8	.16 .18 .21 .23	.23 .25 .29 .33	.30 .33 .38 .44	.38 .41 .48 .55	.47 .50 .58 .65	.61 .65 .75 .85	.85 .95 1.10 1.20
9 .0 .2 	.26 .29 .35 .43	.37 .42 .50 .62	.50 .56 .66	.61 .69 .83	.73 .82 1.00 1.20	1.00 1.15 1.35 1.60	1.40 1.60 1.80 2.20
6. 8. 20.	.49 .57 .61	.72 .82 .90 1.00	.90 1.00 1.15 1.35	1.15 1.28 1.45 1.65	1.40 1.55 1.75 1.95	1.95 2.15 2.35 2.60	2.45 2.70 2.95 3.25
24	.69 .77 .85 .90	1.10 1.35 1.50 1.60	1.55 1.75 1.90 2.10	1.85 2.00 2.15 2.40	2.16 2.36 2.60 2.85	2.85 3.10 3.35 3.60	3.60 3.90 4.20 4.50
30	$1.00 \\ 1.10 \\ 1.20$	1.70 1.80 1.90	2.25 2.40 2.50 2.65	2.60 2.80 3.00 3.20	3.00 3.25 3.50 3.70	3.85 4.10 4.35 4.60	4.80 5.10 5.40 5.70
88	1.30 1.40 1.50 1.60 1.80	2.05 2.15 2.25 2.35 2.50	2.80 2.90 3.00 3.20	3.40 3.60 3.75 4.00	3.70 3.90 4.05 4.20 4.80	4.85 5.10 5.45 5.80	6.00 6.30 6.60 7.20

SPECIAL WIDTHS AND EXTRA LENGTHS MADE TO ORDER

BELT MAKERS TOOLS

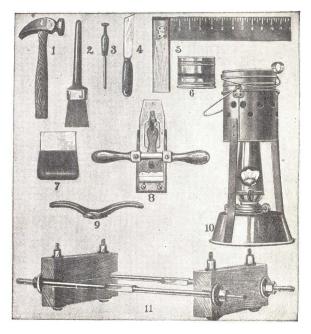


PLATE 7256

- No. 1. Belt Makers' Hammer.
- No. 2. Glue Brush.

 No. 3. Finger Steel for sharpening Belt Scraper, No. 7.
- No. 4. Belt Knife.
- No. 5. Square.
- No. 6. Belt Cement.
- No. 7. Belt Scraper.
- No. 8. Belt Plane for making laps.
- No. 9. Heel Shave for making laps.
- No. 10. Glue Pot.
- No. 11. Belt Clamps, all sizes.

CLIPPER BELT LACING





PLATE 5648 HOOKS, CARDED



PLATE 5647 CLIPPER BELT LACER

PLATE 5649 PINS

PLATE 5647

"Clipper" Belt Lacer No. 3 laces any width or thickness. Laces a 6 inch belt in three minutes. Saves man-time, machine-time, money. Makes a durable, flexible lacing. 45,000 now in use all over the world.

The one belt lacer which makes it unnecessary to remove the belt. The "Clipper" can be carried to the belt. Adapted to all makes of belting, and will accommodate any thickness of belt.

No. 3 Lacer		ch 15.00
No. 0 Lacer	ea	ch 3.50

CLIPPER BELT HOOKS

_		
No. 2.	For thin belts over small sized pulleysper box	1.00
No. 3.	For thin belts over medium sized pulleysper box	1.25
No. 4.	For belts not over 1/4 inch thick per box	1.25
No. 5.	For belts not over \(\frac{3}{8} \) inch thick	1.50
No. 6.	For belts not over $\frac{\pi}{2}$ inch thick per box	1.75

PLATE 5648

"Clipper" Hooks are carded, long and short ends alternating. This card is easily removed after hooks have been locked into the tool. Cards contain 37 hooks each (enough for a 6 inch belt) and are packed 27 cards in a box with 14 rawhide pins, one for each laced joint. Each box will lace 84 inches (in width) both ends of belt.

PLATE 5649

"Fibro" Waterproof and Twisted Rawhide Pins, 12 inches long. 24 pins per bundle.

		Price per	bundle
		"Fibro" Waterproof	Rawhide
No. 13.	6-64 in. diam., for extra thin belts No. 2 and 3 hooks		.70
No. 12.	7-64 in. diam., for thin belts No. 4 hooks	.35	$\frac{.70}{.70}$
No. 11.	8-64 in. diam., for No. 5 hooks	.35	.70
No. 10.	9-64 in. diam., for No. 5 hooks	.40	.80
No. 9.	10-64 in. diam., for No. 6 hooks		.90
No. 8.	11-64 in. diam., for No. 6 hooks	.50	1.00
No. 5.	14-64 in. diam., for heavy belts		1.60
Assorted	sizes, (Nos. 8-13)		.75

STEEL BELT LACING **BRISTOL'S**







PLATE 7259 FOR RUBBER AND WOVEN BELTS ONLY Thickness and Kind of Belt

Price

per Box

1.50

2.00

2.50 3.00

3.50

4.95

6.05

TH	IS STYLE FOR LEATHER BELTS O	NLY		OR RUBBER AND WOVEN BELIS O
No.	Thickness and Kind of Belt	Box	No.	Thickness and Kind of Belt
00	For split leather and extra light belts $\frac{1}{16}$ to $\frac{1}{8}$ inch thick	1.00	1,0.	
0	For split leather and light belts		11	For three-ply rubber and cotton
	1/8 to 3/16 inch thick	1.00	19	belts $\frac{3}{16}$ to $\frac{1}{4}$ inch thick For four-ply rubber and cotton
1	For ordinary single leather belts $\frac{3}{16}$ to $\frac{1}{4}$ inch thick	1.50		belts 1/4 to 5/6 inch thick
2	For extra heavy and wide single leather belts 1/4 to 1/5 in. thick		13	For five-ply rubber and cotton belts $\frac{5}{16}$ to $\frac{3}{8}$ inch thick
3	For double leather belts $\frac{5}{16}$ to $\frac{3}{8}$ inch thick	2.50	14	For six-ply rubber and cotton belts 3/8 to 1/5 inch thick
4	For heavy double leather belts	3.00	15	For seven-ply rubber and cotton belts 7/16 to 1/16 inch thick
5	$\frac{3}{8}$ to $\frac{7}{16}$ inch thick For extra heavy double leather	3.50	17	For eight-ply and extra double heavy rubber and cotton belts
100	belts $\frac{7}{16}$ to $\frac{9}{16}$ inch thick For lightest rubber and cotton	3.30		½ to % inch thick
	belts \(\frac{1}{16}\) to \(\frac{1}{8}\) inch thick	1.00	19	For ten-ply and extra heavy con-
10	For two-ply rubber and cotton belts $\frac{1}{8}$ to $\frac{3}{16}$ inch thick	1.00		veyor belts from 11 to 13 inch thick



PLATE 7260

				OR ALL KINDS OF BELTS	D
No.	Thickness and Kind of Belt	Box	No.	Thickness and Kind of Belt	Box
110	For all kinds of belts $\frac{1}{16}$ to $\frac{1}{16}$ inch thick. Split leather and lightest rubber and cotton belts		114	For all kinds of belts \(\frac{5}{16} \) to \(\frac{3}{8} \) in thick. Double leather belts and \(\frac{5}{2} \)-ly rubber and cotton belts. For all kinds of belts \(\frac{3}{8} \) to \(\frac{1}{16} \) in thick. Heavy double leather belts and \(6 \)-ply rubber and cotton belts. For all kinds of belts \(\frac{7}{16} \) to \(\frac{7}{6} \) in thick. Extra heavy double leather and \(7 \)-ply rubber and	2.50 3.00
111	belts For all kinds of belts $\frac{3}{16}$ to $\frac{1}{4}$ inch thick. Ordinary single leather and 3-ply rubber and cotton belts			cotton belts For all kinds of belts ½ to ½ in. thick. 8-ply and extra double heavy rubber and cotton belts	3.50 4.95
112	For all kinds of belts ½ to $\frac{6}{16}$ inch thick. Extra heavy and single leather and 4-ply rubber and cotton belts	2.00	119	For all kinds of belts 5% to 13 in. thick. 10-ply and extra heavy conveyor belts	6.05

Each box contains (assorted lengths) enough to lace 100 inches in width of belts.



KERR'S WIRE BELT LACING



PLATE 7261

No	0	1	2	2	3
For Belt	Up to 2 1/2	Single 3 to 5 2.00		Double Up to 6 2.00	Double Over 6 2.00

TALCOTT-WILSON BELT HOOKS

FOR SINGLE LEATHER BELTS



PLATE 7262

		AIL 1202				
No	1	2	3	4	5	6
Width of Belt inches Per hundred	1 1.00	$1\frac{1}{4}$ 1.25	$\frac{1\frac{1}{2}}{1.50}$	1 ³ / ₄ 1 . 75	2 2.25	$\frac{2\frac{1}{4}}{2.50}$
No	7	8	9	10	11	12
Width of Belt inches Per hundred	$\frac{2\frac{1}{2}}{3.00}$	$\frac{2\frac{3}{4}}{3.25}$	3 3 . 50	3 ½ 4 . 00	3 ½ 4 . 50	4 5.00

Nos. 1 to 7, 100 in box; Nos. 8 to 12, 50 in box.

FOR DOUBLE LEATHER BELTS



PLATE 7263

No	13	131/2	14	15	16
Width of Beltinches Per hundredinches	$\frac{1}{2}$ $\frac{1}{2}$	1 3/4 3.00	2 3.50	2 ½ 3 . 75	$\frac{2\frac{1}{2}}{4.00}$
No	17	17½	18	A	F
Width of Belt	3 5.25	3 ½ 5.75	3½ 6.25	4 7.25	4½ 8.25

Nos. 13 to 16, 100 in box; Nos. 17 to F, 50 in box.

COMMON BELT HOOKS



No	1	2	3	4	5	6	7	8
Quantity in a Box	100	100	100	100	100	200	200	200
Per Hundred	3.00	2.00	1.60	1.40	1.10	.85	.60	.50
No	9	10	11	12	13	14	15	
Quantity in a Box	300	300	500	500	500	500	500	
Per Hundred	.40	.35	.30	.28	.26	.24	.20	

JONES JEWEL BELT HOOKS



PLATE 7755

No	1	2	3	4	5	6	7	8
Quantity in a Box	100	100	100	100	100	200	200	200
Per Hundred	3.00	2.00	1.60	1.40	1.10	.85	.60	.50
No	9	10	11	12	13	14	15	
Quantity in a Box	300	300	500	500	500	500	500	
Per Hundred	.40	.35	.30	.28	.26	.24	.20	



CRESCENT BELT FASTENERS

The Crescent Principle is the employment of Crescent Plates of special steel placed over the joined ends of the belt and fastened with self-piercing Crescent Rivets, which merely separate the belt fibres without removing any material or weakening the belt in any way.

Crescent Rivets are double pronged or split rivets of special construction. They are especially made for attaching Crescent Plates and differ radically from ordinary rivets.

Crescent Rivets embody the greatest strength without increased weight, because the strength is put where the strain comes. The head is strongly reinforced and the special construction allows the Crescent Rivets to be easily removed.

Their sharp points are easily driven through the toughest belt without removing any of the material or cutting the lengthwise fibres.

When Crescent Rivets are clinched on the pulley side, the ends are sunk below the surface of the belt so that no metal touches the pulley.

Crescent Belt Fasteners are adapted to all leather belting; to Balata, Cotton, Canvas, Hair, Rubber, in fact, to all the various combinations of fabric belting of every length, width and thickness.

They are adapted to all open drives—to quarter and half turn and cross belt drives—to all conditions of work where but one side of the belt comes in contact with the pulleys. Crescent Plates are practically indestructible and can be used again and again.



belting and no bulk.

PLATE 7266
OUTSIDE—CRESCENT JOINT
Note.—Strain is equally distributed
across entire width, thus maintaining maximum strength of the belt. No waste of



PULLEY SIDE—CRESCENT JOINT
Note.—Absence of holes, no material
removed. Perfect joint, absolutely smooth,
prongs firmly embedded in the belt. No
knocking on pulleys.

CHART FOR SELECTION OF CRESCENT PLATES—For Regular World	CHART	FOR	SELECTION	OF	CRESCENT	PLA	TES-F	r Regular Worl	1-
--	-------	-----	-----------	----	----------	-----	-------	----------------	----

	Belt Wid size Cresco will cove	ent Plate	and	1 ½	2	21/2	3	3 1/2	4	Over 4 up to 72
Nature of Work	Size of Smaller Pulley	Use Crescent			1					Use
LIGHT	3ins. or larger	Plate No Price per gross	25 2.88	$\begin{vmatrix} 45 \\ 5.76 \end{vmatrix}$	65 8.64	85 11.52	805 11.52			enough Crescent Plates
GENERAL	6 ins. or larger	Use Crescent Medium Grip Plate No Price per gross		67 8.64	607 8.64	87 11.52	107 14.40	127 17.28	147 20.16	of the Same Grip
GENERAL With Woven Belts		Use Crescent Special Grip Plate No Price per gross			63 11.52	83 14.40	103 17.28	123 20.16		pletely cover the width of the
HEAVY	12 ins. or larger	Use Crescent Long Grip Plate No Price per gross				109 17.28	149 23.04	1409 25.92	189 28.80	belt

Alleria say



BELT FASTENERS CRESCENT

Crescent Belt Fasteners are also made for High Speed Work and for Extremely Heavy Work as follows:

FOR HIGH SPEED AND MOTOR DRIVES Crescent High Speed Plates
Belts 3/4 to 6 inches wide
Pulleys 2 inches or larger diameter

No. 20 Crescent Plate for 3/4 and 1 inch beltsper gross	2.88
M. 40 Creasent Plate for 1 and 2 inch belts	0.10
M. 44 Creasent Plate for 116 and 3 inch belts	0.10
No. 60 Crescent Plate for 2 and 4 inch beltsper gross	8.64

Belts $1\frac{1}{2}$, 3, $4\frac{1}{2}$ and 6 inches wide Pulleys 4 inches or larger diameter

No. 66 Crescent Plate covers 1½ inch belt width.....per gross 8.64

FOR EXTREMELY HEAVY WORK Crescent Jumbo Plates

For Driving purposes pulley 36 inches or larger For Conveying purposes pulleys 18 inches or larger

No. 1611 Crescent Plate covers 3 inch belt widthper gross	28.80
No. 2211 Crescent Plate covers 4 inch belt widthper gross	34.56

To attach Crescent Short, Medium, Special and Long Grip Plates use Crescent Large Shank Rivets $\frac{1}{16}$ inch longer than the thickness of the belt, to allow for Crescent Plate and proper clinch.

CRESCENT LARGE SHANK RIVETS

		7.1		_						
Size Inches	5/16	6/16	7/16	8/16	9/16	10/16	11/16	12/16	13/16	14/16
Per gross	.70	.70	.80	.80	.90	.90	1.00	1.00	1.10	1.10

Cut shows actual size 10/16

PLATE 7264

To attach Crescent Jumbo Plates use Crescent Jumbo Rivets 5/18 inch longer than thickness of belt, to allow for thickness of Crescent Plate and proper clinch.

CRESCENT JUMBO RIVETS

SizeInches	10/16	11/16	12/16	13/16	14/16	15/16	16/16	18/16
Per gross	1 25	1.40	1.40	1.55	1.55	1.70	1.70	1.85

Cut shows actual size 12/16



LATE 7265

To attach Crescent High Speed Plates use Crescent Small Shank Rivets $\frac{3}{16}$ inch longer than thickness of belt, to allow for thickness of Crescent Plate and proper clinch.

CRESCENT SMALL SHANK RIVETS

SizeInches	5/16	6/16	7/16	8/16	9/16	10/16
Per gross	. 50	. 50	. 55	. 55	. 60	.60

PLATE 7265A

Cut shows actual size 7/16

No. 79 Crescent Rivet Extractor, 50 cts. ea.

A Crescent Rivet Holder is included in each box of Crescent Rivets, without charge.





LACE LEATHER CUTTERS



PLATE 5425

No. 1 Cuts $\frac{3}{16}$ to $\frac{3}{4}$ inch wide.....each .50

IMPROVED IRON SCREW BELT CLAMPS



PLATE 5426

No. 270	For 6 to 14-inch Beltseach	8.00
Ne 271	For 12 to 18-inch Beltseach	10.00
No. 272	For 18 to 24-inch Beltseach	12.00
No 273	For 24 to 36-inch Beltseach	18.00

MORAN BELT COUPLINGS



PLATE 5427

Size Inches	1/8 to 5/32	3 16	1/4	16	3/8	7 1 5
Per Dozen	3.00	2.50	2.00	2.50	3.00	3.50
SizeInches	1/2	5/8	3/4	7/8	1	
Per Dozen	4.00	6.00	9.00	13.00	18.00	



ROUND BELT PUNCHES



PLATE 7289

Nos. 0, 00	per dozen 4.00
Non 1 9 9 4 5	per dozen 2.00
Nos 6 7 8 0	Der dozen 2.20
Nos 13 14	Der dozen o.oo
Nos. 15, 16.	per dozen 6.50

SPRING PUNCHES



PLATE 7290

No. 228	All Steel,	Regular Finish,	list	. per dozen	5.00
---------	------------	-----------------	------	-------------	------



PLATE 7291

Extra Serow Tubes (Tubes only) assert	dper dozen	2.00
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REVOLVING SPRING PUNCHES



PLATE 7292

No. 354	Four Tubes, assorted sizes	. per dozen 12.00
No. 344	Six Tubes, assorted sizes	per dozen 14.00



PLATE 7293

Extra Drive T	'ubes (Tubes only)	assorted	per dozen	2.00



WASHER CUTTERS



PLATE 7285

Black Handle....per dozen 10.00

RIVET HOLDERS



PLATE 7286

No. 70Small Shank Rivet Holderper dozen.36No. 72Large Shank Rivet Holderper dozen.36No. 73Jumbo Shank Rivet Holderper dozen.36

RIVET EXTRACTORS



PLATE 7287

 No. 78
 Rivet Extractor and Cutting Nippers.
 each 1.00

 No. 79
 Rivet Extractor only.
 each .50

PIERCING PUNCH



PLATE 7288

No. 74	Small Shank Piercing Puncheach	25
No. 76	Large Shank Piercing Puncheach	25
No. 77	Jumbo Shank Piercing Puncheach	.25

Used in joining Overhead Belts.



STEPHENSON BAR BELT DRESSING



PLATE 8121



PLATE 8122

12 lb. box.	per lb.	.40
30 lb. box	per lb.	.39
50 lb. box	per lb.	.38
100 lb, box	per 1b.	.36

DIXON'S SOLID BELT DRESSING



PLATE 8123

Put up in one pound bars of convenient shape and size. Applied to belts while in

motion, stops all slipping instantly.

Increases efficiency of belts that are too narrow for the load.

Superior to rosin, tar and vegetable or animal oils. Equally satisfactory for leather, rubber, canvas or fabric belting.

Per case of 25 bars. 6.00

SHEET PACKINGS



PLATE 8046

Generally used in the form of gaskets, the thickness of the gasket depending on the roughness of the flanges. On smooth flanges a thin gasket of a given width will withstand greater pressure than a thick one. For heavy pressures, gaskets should be cut as wide as possible. Nuts should be drawn up gradually on all sides so that both flanges approach each other as nearly parallel as possible. Unequal compression at the beginning causes distortion and the packing is more liable to blow out.

CLOTH INSERTED PACKINGS



PLATE 8047

For use with water which is cold or merely warm at ordinary pressures, 300 lbs. per square inch. And for air which is practically free from oil at low pressure, 100 lbs. per inch or less.

Made either cloth inserted, cloth one side or cloth both sides.

Thickness	1 Ply	2 Ply	3 Ply	4 Ply
inch	.70			
inch is inch	. 65 . 60	69		•••
$\frac{3}{32}$ inch	. 55	. 63 . 58	. 66 . 61	
1/8 inch	. 55 . 55	. 58 . 55 . 55	. 58	.61
½ inch	. 55	. 55	. 55 . 55	.58 .55

One ply cloth to every $\frac{1}{16}$ inch thickness. Three cents per pound additional will be charged for each extra ply.

All packing is one yard wide, and any length desired.



INDIAN RED SHEET PACKING



PLATE 8048

A general purpose red sheet packing, intended for use with water, air or steam, for pressures up to 150 pounds per square inch. Does not blow out, harden or crack, and resists the action of steam, hot water, acids, ammonia and other alkalis. "Indian Red" is serviceable in any climate.

It can be removed and used over again by the application of chalk or plumbago to the face of the joint. Also furnished with brass wire insertion if desired. $\frac{1}{32}$, $\frac{1}{16}$, $\frac{1}{32}$, $\frac{1}{16}$, $\frac{1}{32}$.

inch thickness.

BRASS WIRE INSERTION PACKING



PLATE 8049

VOLUNTEER OIL RESISTING SHEET PACKING



PLATE 8050

A black, non-blooming packing of light stock, yet sufficiently heavy to meet the requirements where heavy pressures and gases are encountered. It is as completely oil resisting as it is possible to make a rubber compound and is therefore, particularly suitable for use in air compressors or wherever oil is a troublesome factor, $\frac{1}{42}$, $\frac{1}{16}$, $\frac{3}{42}$, $\frac{1}{16}$ inch thickness.



SUPER-HEAT SHEET PACKING



PLATE 8051

Unequalled as a packing for high pressures and superheated steam, also ammonia, acids, air and gas. It contains a large percentage of asbestos, and is so made that the original lengths of the fibres is retained in the finished product, thus insuring great strength.

"Elbon" withstands over 400 pounds steam pressure. It has been tested to 1,200 degrees temperature and 900 pounds steam pressure without a sign of weakening. It comes in sheets 50 inches square, with fibres crossed to insure the greatest possible strength. $\frac{1}{42}$, $\frac{1}{16}$ and $\frac{1}{2}$ inch thicknesses.

Due to its light weight, "Elbon" is unusually economical.

PURE GUM SHEET PACKING

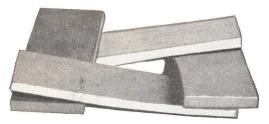


PLATE 8052

A sheet packing made altogether from a rubber compound without cloth or wire insertion. There is a great variety of uses for this material and sample sheets of various specific gravities, colors and toughness will be furnished upon application.

Sheets ¼ inch thick and less are furnished in rolls of 200 lbs. 36 inches wide. Any thickness can be furnished in strips at slightly advanced prices.

Inasmuch as the various grades are not carried in stock and the making up of small quantities involves extra labor and expense, the price for any particular grade is necessarily higher where the material is ordered in lets less than 100 lbs. of a thickness at a time.



RED SHEET PACKING RAINBOW



PLATE 8053

Made in Rolls about 200 lbs. each, $\frac{1}{32}$, $\frac{1}{16}$, $\frac{3}{32}$, $\frac{1}{8}$, $\frac{3}{16}$, $\frac{1}{4}$, $\frac{3}{8}$ and Per Pound. inch..... With Wire Insertion, manufactured, 16, 1/8, 3 and 1/4 inch thick.... Per Pound,

PACKING SHEET ASBESTOS

WIRE INSERTED



PLATE 8054

This packing is practically indestructible. It will not burn out under the most extreme temperature. It is the ideal packing for high pressure, superheated steam, gas or dry heat conditions. It is made from long fibre asbestos, spun around fine brass wire into threads of great tensile strength, which is then woven into cloth. This cloth is then inserted between plies of special compound and vulcanized under great pressure. Unlike the ordinary asbestos cloth packing, which is simply coated with a cement, this packing is absolutely unaffected by condensation or wet steam and does not disintegrate.

11/8 inch thickness.

> GASKETS MOULDED

.....per pound 1.50



PLATE 8055

We can supply cut and molded gaskets in endless variety, including both manhole and handhole boiler gaskets, flat gaskets cut from Red Sheet, Pure Gum, and cloth inserted sheet. We are also prepared to furnish you with special gaskets to your own specifications.



PACKINGS

RING PACKING



PLATE 8124 SECTIONAL



SPIRAL



PLATE 8126 EXPANSION

Sectional or caired wing as ali-	
Sectional or spiral ring packings	1.00
Expansion ring packing under 1 inch diameter	.12



PLATE 8127 GUM CORE PACKING



PLATE 8128 SQUARE DUCK HYDRAULIC PACKING



PLATE 8129 SQUARE PURE GUM PACKING

GUM CORE PACKING

Per pound	. 60

Gum core packing is made from superior quality of flax yarn, thoroughly lubricated.

SQUARE DUCK HYDRAULIC PACKING

Per pound	1.4	0
The state of the s	1.1	·

Square duck hydraulic packing is made on fine woven fabric and held together with strong white friction. Designed to have a minimum of expansion in most severe service in either hot or cold water. This packing is especially adapted for elevator plungers, hydraulic presses, hammer rams and pump rods.

SQUARE PURE GUM PACKING

	-
Per pound	1.50
A A SHOULD WE WINDOW WE WINDOW W	



RELIANCE HIGH PRESSURE PACKING



PLATE 8130

Reliance packing is for pressures over 100 pounds and is particularly adapted for marine engines, locomotives and high speed engines, superheated and high pressure steam.

It is made from the best long fibre asbestos with non-vulcanizing cushion and lubricated with high speed non-conbustible compound.

This packing can be furnished in coil, spiral and ring form.

¼ inch and larger in sixteenths.....per pound....

DIAGONAL ROD PACKING



PLATE 8131 HIGH PRESSURE



PLATE 8132 LOW PRESSURE

HIGH PRESSURE DIAGONAL ROD PACKING

Diagonal rod packing for high pressure is made in ring and spiral form; it is also furnished in sets fitting the rod and box. The illustration shows the position in which the packing should be applied.

	1.25
Per pound	1.40

LOW PRESSURE DIAGONAL ROD PACKING

Diagonal rod packing for low pressure is made in sets as shown by the illustration, also in spiral and coil form, and is for pressures under 100 pounds. Made in sizes from ¼ to 3 inches in sixteenths. Each spiral is in uniform lengths of 12 feet.

	1.00
Per pound	1.00
rer pound	

GENUINE BELL BRAND SQUARE FLAX PACKING



PLATE 8133

Genuine Bell brand square flax packing is furnished in three grades, regular process, wax and very soft, and is without equal regardless of price. It is composed of the finest grade of pure Archangel extra long fibre Russian flax, and is free from hemp, jute, tow or other adulterations. It contains only pure lubricants, which do not corrode the rod or plunger.

Per pound

VALVOLITE PACKING FOR SMALL



Valvolite twist packing is made from special material that will not harden or char under extreme heat or pressure, and will retain its life until completely worn out. Each strand is carefully twisted and lubricated—forming a complete packing in itself—so where the whole twist would be too large it takes but a moment to unstrand to fit the size of valve stem or rod you wish to pack. One pound spools.

SizeInches	1/8	3 16	1/4
Per pound.	1.00	1.00	1 00

Also made in braided form, round and square, size 1/4 to 2 inch, same price.

TUBULAR GASKETS



PLATE 8135

DiameterInches	3/8	1/2	5/8	3/4	7/8	1
Length per box feet Weight per box pounds	36 2 34	36 5	24 5 34	18 6	12 6 1/1	12

 1/4 and 3/8 inch for pipe unions.
 5/8 and 3/4 inch for manhole plates. 12 inch for handhole plates.

7/8 and 1 inch for extra large manhole plates.



PACKINGS



PLATE 8136 ASBESTOS ROPE PACKING



ASBESTOS PACKING

These packings are composed of selected asbestos fibre spun into strands which can be separated and made in the form of lamp wick.

CANDLE WICKING



PLATE 8138

Candle wicking, 5 pound sacks, 12 balls to the pound per pound

.30

VALVE SPRINGS



PLATE 8139

SizeInches	1 1/2	1 3/4	2	21/2	3	3 1/2	4	4 1/2
Diameter of base inches	1 ½ .50	1 ½ . 50	1½ .60	2 .70	2½ .80	3.90	3 ½ 1.00	$\frac{3\frac{3}{4}}{1.10}$
SizeInches	5	5 1/2	6	6 1/2	7	7 1/2	8	
Diameter of base inches	$\frac{4\frac{1}{4}}{1.20}$	$\frac{4\frac{3}{4}}{1.30}$	5 ½ 1.40	5 ¾ 1 . 50	6 1.60	$\frac{6\frac{1}{2}}{1.70}$	7 1.80	

CORRUGATED MATTING

Rubber matting is being used more and more wherever a clean, sanitary, inexpensive floor covering is desired. Because of its long wearing qualities, it is especially favored for use in public and semi-public buildings, transportation lines of all kinds, etc., Standard width 36 inches and from $\frac{3}{32}$ to $\frac{1}{4}$ inch thick. Can be supplied up to 50 inches Besides corrugated mattings, made in duplex, pyramid and pebble designs. Switch board matting intended for use in front of switch boards, nonconducting and will withstand 25,000 volts in 1/4 inch thickness.



PLATE 8056

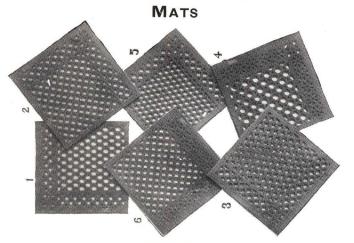


PLATE 8057

Perforated Mats are manufactured in regular or irregular shapes and with smooth or corrugated surfaces. Monogram initials, names, fac-simile signatures or other special designs may be inserted in color; i.e., white or red letters or designs on a black field or black letters or designs on a red field.

In ordering mats it is important that the thickness and pattern number as above be specified, as well as the length and width. Mats of irregular shapes should be ordered by paper pattern. Three-eighths inch thickness is generally standard. Prices are quoted by discount from the Perforated Mat list.

Block pattern Mats are sometimes used in place of perforated mats. They are furnished in a variety of sizes as desired.

Stair Treads are moulded in 6 x 18, 8 x 18, 8 x 20 and 8 x 30 inches and 1/8 inch thick. A one inch border is put around the edge while the center is corrugated.

STEAM HOSE



PLATE 8023

Too much precaution cannot be exercised in specifying brand and ply in steam hose, owing to the danger in handling and liability of breaks, but the great diversity of conditions surrounding its uses render it impracticable to give an accurate table of sizes and plies for given purposes. One point, however, should be always borne in mind—the strain of steam hose increases as the diameter increases. One inch hose will bear nearly 100 per cent. greater pressure than two inch hose of the same number of plies.

The nature of the steam itself, that is, dry steam as compared with wet, or steam carrying oil, would require different grades or types of hose. It sometimes occurs that steam hose is in service for the day and is allowed at night to freeze and is thus subjected to extremes in temperature.

Sometimes, as in steam drill hose, the pressure is on one minute and off the next.

For hot water or low pressure service occasionally 4 ply hose is successfully used, however, 5 ply is usually the minimum and on sizes over one inch 6 ply is minimum.

"Diamond Steam Hose" on account of its superior material and construction, should be used for everything over 80 pound pressure.

"Gulf Steam Hose" for all steam pressure below 80 pounds.

Both these brands can be furnished with Marline woven jackets, Marline winding and Oval, Flat or Round wire winding.

STEAM HOSE LIST

Internal Diameter Inches	3 Ply	4 Ply	5 Ply	6 Ply	7 Ply	8 Ply
1/2	.47	. 56	.70	.84	.98 1.23	1.12
3/4	.57	.71	1.07	1.05 1.28	1.50	1.70
11/4	.85	1.04	1.30	1.56	1.82	2.08
$1\frac{1}{2}$	1.02	1.25	1.56	1.87	2.18	2.50
1 3/4	1.18	1.45 1.66	1.81	$\frac{2.17}{2.49}$	2.53 2.90	2.90
$\frac{2}{2}\frac{1}{4}$	1.34	1.87	2.33	2.80	3.27	3.74
2 1/2	1.66	2.08	2.60	3.12	3.64	4.16

Discounts on application.

To obtain prices on higher plies than given, add to the price given for 4 ply 25 per cent. for each additional ply.



SUCTION HOSE

For excavating, wrecking, mining, sand pumps, steam fire engines, dredging, etc.





PLATE 8024 SMOOTH BORE

PLATE 8025 ROUGH BORE

According to the method of construction, all suction hose may be divided into three classes—Plain Bore, Smooth Bore and Hard Rubber. The Plain Bore, known also as Rough Bore, has a wire coil exposed on the inside. The Smooth Bore type has a coil of wire entirely imbedded within the wall and the Hard Rubber type is made without wire but with rubber compounds which are stiffer than those generally used in hose construction.

"Gulf Smooth Bore" having the wire coil completely imbedded in its wall is better adapted for water carrying mud, sand or gravel.

"Clipper Rough Bore" having the wire coil exposed is adapted for clear water or liquid.

"Clipper Hard Rubber" only recommended for light work and in sizes not over $1\,\%$ inch. Price net per foot on application.

In ordering Suction Hose always state if the ends are straight or enlarged and if couplings are required.

SMOOTH BORE

Internal DiameterInches	1	114	1 1/6	1 1 3/	1 9	1 9 1/	101/	1 0	
D. T.	_	-/-	-/2	1/4		4/4	2 1/2	3	3 1/2
Per Foot	1.05	1.30	1.70	2.15	2.60	3.05	3.50	4 50	5 50
Internal Diameter Inches	4	4 1/2	5	51/2	6	61/2	1 7	716	0.00
Per Foot	6.50	7.50	8.50	9.50	10 50	12 00	12 50	15 00	10.50
Internal Diameter Inches	0	1 10	10 1			1500 0000	110.00	15.00	16.50
				14	15	16	17	18	
Per Foot	19.50	22.50	27.50	32.50	85 00	37 50	10.00	19 50	

ROUGH BORE

Internal DiameterInches	3/4	1	11/4	11/2	1 3/4	2	121/1
Per Foot	.70	. 90	1 15	1 50	1 90		10000
Internal DiameterInches	$2\frac{1}{2}$	3	3 1/2	4	4 1/2		51/2
Per Foot	3.10	4.00	4.90	5 80	6 70	7 60	8 50
Internal Diameter Inches	6	7		8		10	12
Per Foot	9.50	12.00		15.00		20 00	25.00



PNEUMATIC TOOL HOSE



PLATE 8026

For use on riveters, hammers, and other pneumatic tools. Made of heavy duck construction with tube or inner lining of special stock to resist the action of oil.

Pneumatic tools usually operate under pressure ranging from 25 to 125 lbs. per square inch, the average being about 100 lbs. For such service the following plies for fabric construction and braids for braided construction are recommended:

% inch, 4 or 5 ply or 2 braid; ½ inch, 5 or 6 ply or 2 braid; % and % inch 6 or 7 ply or 2 or 3 braid.

Sold at net price per foot.

Above 1 inch hose of this construction is known as air drill hose, and is used in mining and excavating work on Air Drills.

Price based on Steam Hose list. (See steam hose page.)

BREWERS HOSE



PLATE 8027 BREWERS HOSE



PLATE 8028 BREWERS SUCTION HOSE

Brewers Hose has an inner tube or lining made of pure rubber that successfully resists the action of beer or liquor and imparts no odor. It is covered with an extra tough covering to withstand dragging over cement floor, vat edges and general rough usage.

In Brewers Suction Hose, made in $1\,\%$ inch and over, heavier duck is used to prevent collapsing.

This hose is sold net price per foot.

Conducting hose is ordinarily used in sizes ½ inch to 1½ inch.

Diamond made with red cover, Sphinx with white cover.

Price based on steam hose list. (See steam hose page.)

Wine hose similar in construction to Brewers hose, but furnished for both conducting and suction purposes.

Price based on steam hose list. (See steam hose page.)

WATER HOSE



PLATE 8029

"Gulf" is a hose of the wrapped duck type, exceptionally light, tough, pliable and strong. Resists the ill effects of kinking and bending, and is easily handled. It is adapted for all uses requiring the transmission of water from ordinary sprinkling to hydraulic testing.

Made in lengths up to 50 feet, size and ply according to service.

Internal Diameter Inches	2 Ply	3 Ply	4 Ply	5 Ply	6 Ply
1	.33	.40	. 50	. 62	.75
1 1/4	.42	. 50	. 62	.77	.93
1 1/2	. 50	. 60	.75	. 93	1.12
1 3/4	.58	.70	.87	1.08	1.30
2	.66	.80	1.00	1.25	1.50
$2\frac{1}{4}$.75	.90	1.12	1.40	1.68
$2\frac{1}{2}$.83	1.00	1.25	1.56	1.87
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$.92	1.10	1.37	1.71	2.05
3	.99	1.20	1.50	1.87	2.25
3 1/2	1.15	1.40	1.75	2.18	2.62
4	1.32	1.60	2.00	2.50	3.00
5	1.65	2.00	2.50	3.12	3.75
6	1.98	2.40	3.00	3.75	4.50
3 ½ 4 5 6 7	2.31	2.80	3.50	4.38	$\frac{4.30}{5.25}$
8	2.64	3.20	4.00	5.00	6.00
9	2.97	3.60	4.50	5.62	
10	3.33	4.00	5.00	6.25	6.75 7.50

FIRE HOSE



PLATE 8030

"Portage Underwriters'" Fire Hose is made to the Specifications of the National Board of Underwriters and bears their label. It contains a tube of fine Para rubber, covered with a very sturdy cotton jacket.

Made in all sizes from 1 ½ inch to 2 % inch, coupled or uncoupled. The 2 % inch size is standard. Net price per foot upon application.



COTTON RUBBER LINED DOUBLE JACKET FIRE HOSE



PLATE 8031

PLATE 8032

"Arctic" and "Titan" Double Jacket Fire Hose are the types usually purchased by municipalities.

The strength of fire hose lies entirely in the grade, weight and weave of the cotton jackets and the life of the hose lies entirely in the quality of the rubber lining. Our inside tubes—of the finest grade—are united to the cotton jacket with a good adhesive compound that makes the hose wall one permanent unit, fills up the corrugations made by the weaving and affords an absolutely smooth waterway.

COTTON MILL HOSE



PLATE 8033



PLATE 8034

"Moose" and "Elk" are Single Jacket Fire Hose designed primarily for mill protection. Each possesses a high quality rubber tube and a strong outer cotton jacket.

By taking the hose from the reel or racks, as the case may be, once every month and running water through it, indefinite service will result. The water serves to keep the rubber tube in excellent condition.

"Moose" withstands 300 lbs. pressure and "Elk" 200 lbs.

LINEN FIRE HOSE

RENDEIN UNDERWRITERS LINEN HOSE



PLATE 5593

Color line consists of a central stripe of three red warps alternating with two yellow ones and on either side a broken stripe of two black warps. Made in any length and labelled strictly in accordance with the requirements and specifications of the Associated Factory Mutual Fire Insurance Companies and the National Fire Protection Association as an unlined linen fire hose for inside fire protection.

Diameters: $-\frac{3}{4}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, 2, $2\frac{1}{4}$, $2\frac{1}{2}$ and 3 inches. Prices on application.

SENATE LINEN HOSE



PLATE 5594

Stripe consists of three blue and two red warp strands, the three blue strands show only on each second pick of weaving in the stripe, and the two red strands on the pick intermediate to the blue. Made in any length and capable of withstanding any ordinary pressure.

Diameters: $-\frac{3}{4}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, 2, $2\frac{1}{4}$, $2\frac{1}{2}$ and 3 inches. Prices on application.

GARDEN HOSE

Sizes: ½, 5/8, 3/4 inches.

Prices on application.



PLATE 8035

"Clipper" is the highest type of braided construction garden hose. Made with seamless tubing, then a cover is braided or woven on this tube. Over this is placed an application of rubber and another ply woven on. Over all is placed a good rubber cover. This construction makes it almost impossible to kink the hose or in any way retard the flow of water. The braided construction is a safe-guard against the wearing out of the hose from dragging across cement pavements, etc.

Sold in lengths or in 250 ft. or 500 foot reels.



PLATE 8036

"Sphinx" is the same construction as "Clipper", except made with corrugated cover.



PLATE 8037

"Zulu" has the same construction as "Clipper" with the exception of a slightly thinner wall. Sold in lengths, or in 250 and 500 foot reels.



PLATE 8038

"Star" has the same construction as the "Zulu," except made with corrugated cover.

GARDEN HOSE

Sizes: ½, 5/8, 3/4 inches. Prices on application.



PLATE 8039

"Arctic" is the highest grade of multiple Fabric Garden Hose. Made of seamless rubber tubing, with seven plies of closely woven fabric well frictioned and a rubber cover. It is very strong and its many plies are a guard against kinking and twisting. This hose will fulfill any requirements.

Sold net price per foot in lengths up to 50 feet, coupled ready for use.



PLATE 8040

"Polar." Similar to "Arctic." Also the highest grade of multiple fabric hose, with seamless tubing, but with five plies instead of seven.

Sold net per foot in lengths up to 50 feet, coupled ready for use.



PLATE 8041

"Antelope." Similar in construction to "Polar" and "Arctic," but with lighter fabric in the plies. This is made in five, six, or seven plies. In lengths up to 50 feet, coupled ready for use.

RADIATOR HOSE



PLATE 8042

"Clipper Radiator Hose." This hose is used in short lengths as flexible connections in water cooling systems on automobiles. The water is always under a very low pressure, but ranges in temperature from the atmospheric temperature to the boiling point. Consequently a hose of comparatively light construction, but made from steam hose materials is most satisfactory. "Clipper" has this construction and the special compounding is used as a guard against oils, greases and gasoline. Sold net per foot.

GASOLINE HOSE



PLATE 8043

"Portage Gasoline Hose." Made to the specifications of the Board of Underwriters' construction, with a coil of flat wire exposed on the inside. Between the wire and tube is a ply of fabric which prevents the tube from separating. Inner tube will resist the harmful action of gasoline, while the outer cover is impervious to the action of oil. "Portage" Gasoline Hose is also suitable as either a conducting or a suction hose for kerosene, naphtha, benzine and all kinds of oils. Sold net per foot.

1.50



TUBING



PLATE 8044

Cloth Inserted Tubing is used for air pumps, beer, or other liquids, gas connections and many other similar uses. It is light and strong and made of very best of rubber and

Garage Air Hose is specially constructed of extra heavy C. I. Tubing and is used for high pressure service on auto pump and air lines. Both rubber tube and cover stock are impervious to action of oil. This may also be ordered wire wound.

Pure Gum Tubing is simply tubing without cloth insertion, used for liquid, air, etc., or can be cut into short lengths as washers, bushings and insulators. State grade when

RUBBER PUMP VALVES



PLATE 8045

For water pump, boiler feed pumps, condensors, etc.
"Luzerne." Medium valve for high pressure cold water service. Maximum, 350 lbs.
Also for warm water up to 170 degrees. Proved by years of successful service in deep mine pumping, best for water works, elevator pumps, surface condenser air pumps and gen-

"Defiance." Semi-soft for cold or warm water up to 175 pounds. Affords maximum service in gritty liquids. Tough enough to resist pressure, yet soft and elastic enough to seat without slippage. Does not wear valve seats.

"High Service." Bone-hard valve for hot water 170 to 212 degrees, maximum pressure 300 lbs. Will stand up where all other valves fail. Better than metal. For this severe service the best is most economical. Also suitable for oils, alkalis and other de-

"Crescent." Soft, for cold or warm water up to 50 pounds. Especially adapted for jet condenser air pumps, or for any low pressure pump requiring large size valves that must stand constant bending. Toughest and strongest rubber made. Affords maximum durability in handling sandy water or destructive liquids.

When ordering please give outside diameter, thickness and size of hole

DiameterInches	2	21/4	21/2	AND S	1 0			
Thickness and size of hole ins.		2/4	4 72	2 %	3	31/4	$3\frac{1}{2}$	3 3/4
	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
	nches	4	4 1/4	4 1/2	4 3/4	5	51/2	6
Thickness and size of hole	ins	5/8	5/8	5/8	5/6	5/6	5/6	3/

SWINGING HOSE RACKS



PLATE 5652 WIRT'S ROYAL PRESSED STEEL HOSE RACK



PLATE 5653 WIRT'S HUMP HOSE RACK, STYLE T

PLATE 5652

Capacity		100 to 150 feet Linen Hose
No	1037	19X
Japanned red on steel	6.00 7.00	6.00 6.00 7.00 8.00 13.00

Furnished in red finish and with wall bracket if not otherwise specified. List prices include wall brackets or pipe clamps, the latter not in excess of 4 inch; 4½ inch, 25c; 5 inch, 30c; 6 inch, 35c, each net extra

PLATE 5653

The Hump Racks are furnished in japanned red unless otherwise specified; furnished in gold or aluminum bronze if desired without extra charge; finished in nickel or copper plate at an additional cost of 2.00 each net.

No.	Size of Hose	Capacity Unlined Linen Feet	Capacity Cotton Mill Hose Feet	Price
A0 A0X A00 A075 A0X75 A0X75 A1X A2 A3 A3X A4 A5 A5X A6	1 ¼ or 1 ½ in. 2 in. 2 ½ in. 1 ¼ or 1 ½ in. 2 ½ in. 1 ¼ or 1 ½ in. 2 ½ in. 2 ½ in. 1 ¼ or 1 ½ in. 2 ½ in. 1 ¼ or 1 ½ in. 2 ½ in. 1 ¼ or 1 ½ in. 2 ¼ in. 1 ¼ or 1 ½ in. 2 in. 2 ¼ in. 1 ¼ or 1 ½ in. 2 in. 2 ¼ in. 2 ¼ in.	50 50 50 75 75 75 100 100 100 150 150 200 200	25 25 25 25 50 50 100 100	5.00 5.00 5.00 5.50 5.50 6.00 6.00 7.00 7.50 7.50 7.50 8.00

For 1 inch hose, A0, A075, A1, A3 and A5 can be specially made without extra charge Furnished with wall brackets unless otherwise specified.

List prices include either wall brackets or pipe clamps, the latter not in excess of 4 inch; 5 inch, 35c; 6 inch, 50c; 7 inch, 65c, and 8 inch, 75c per pair net extra.

SWINGING WALL HOSE REELS



PLATE 5651

Style V Wall Reels are furnished in Japanned red, unless otherwise specified; finished in gold or aluminum bronze, if desired, without extra charge. Any size (excepting No. 8) plated in nickel or copper, at an additional cost of \$2.00 each, net; for No. 8, \$2.50, net; white enamel finish, 50 cents each net extra any size.

No.	Size of Hose	Capacity Unlined Linen Feet	Capacity Cotton R. L. Mill Hose Feet	Price
$\begin{matrix} 0 \\ 00 \\ 000 \\ 000 \\ 0 \\ 1/2 \\ 00 \\ 1/2 \\ 000 \\ 1/2 \end{matrix}$	1 1/4 or 1 1/2 in. 2 in. 2 1/2 in. 1 1/4 or 1 1/2 in. 2 in. 2 in. 2 1/2 in.	50 50 50 75 75 75	::	6.00 6.00 6.00 6.00 6.00 6.00
$\begin{array}{c} 1 \\ 2 \frac{1}{2} \\ 3 \frac{1}{2} \\ 2 \\ 3 \end{array}$	1 ½ or 1 ½ in. 2 in. 2 ½ in. 1 ¼ or 1 ½ in. 2 in.	100 100 100 150 150	50 50	6.00 6.00 6.00 6.00 6.00
21/2 32 3 4 1/2/2 3 4 5 6 7 5 6 7 8 9	2½ in. 1¼ or 1½ in. 2 in. 2½ in. 1¼ or 1½ in.	150 200 200 200 200 300	100	6.50 7.00 7.50 8.00
6 7 8 9	2 in. $2\frac{1}{2}$ in. $2\frac{1}{2}$ in. $2\frac{1}{2}$ in. $2\frac{1}{2}$ in.	300 300 400 600	100 100 150 200	7.50 8.00 8.50 11.50 15.00

NOTE.—Nos. 5, 5½, 6, 6½, 7, 7½, 8 and 9 are made for two tiers of hose. List prices include either wall brackets or pipe clamps, the latter not in excess of 4 inch; 5 inch clamps, 35c; 6 inch, 50c; 7 inch, 65c, and 8 inch, 75c per pair net extra.



PLAIN BRASS HOSE



		PLATE 4033	3 A
Size Inches	Length Inches	Outlet Diameter Inches	Price Per Dozen
$ \begin{array}{c} 3/4 \\ 1 \\ 1/4 \\ 1/2 \\ 2 \\ 2/4 \end{array} $	6 8 10½ 10½ 11 12	1/8 1/8 3/8 1/2 5/8 3/4	7.00 9.00 15.00 18.00 30.00 48.00 78.00

In ordering state whether Hose or Iron Pipe Thread.

BRASS SCREW TIP HOSE PIPES



PLATE 4034 A

Size	Length	Price
Inches	Inches	Per Dozen
34 34 1 1 1 114 114 114 115 115 115 115 2 2 2 2 2 2 2 2 2 2	8 12 8 12 15 20 12 15 20 12 20 15 20 12 20	8.00 10.00 10.00 12.00 20.00 24.00 30.00 25.00 30.00 36.00 38.00 50.00 75.00 96.00

C. L. E. CAST HOSE PIPES



PLATE 4035 A

Size CouplingInches	3/4	3/4	- 3/4	3/4	1	1	1	11/4	11/4
LengthInches	6	8	9	12	8	9	12	12	15
Priceper doz.	11.00	13.00	18.00	18.00	15.00	20.00	20.00	40.00	45.00
Size CouplingInches						2	$2\frac{1}{2}$	21/2	
LengthInches	20	12	15	20	12	20	15	24	
Priceper doz.	55.00	55.00	60.00	80.00	80.00	110.00	150.00	200.00	



GEM HOSE NOZZLES



PLATE 839

Hose Reducers

HOSE BIBB ENDS





PLATE 840

HOSE REDUCERS

Size					Inches	8	1 x ¾	11/4 x	1 1	$\frac{1}{2} \times 1\frac{1}{4}$
Per Dozen							6.50	10.00		12.00
	н	OSE	ВП	вв	ENDS	5				
Cina	Inahaal	1/	1 3	1	1 1	ī	11/	1 11/	1	9

SizeInches	$\frac{1}{2}$	3/4	1	1 1/4	1 1/2	2
Per Dozen	3.00	4.20	6.00	9.00	12.00	18.00



HOSE NIPPLES

SizeInches	1/2	3/4	1	11/4	1 1/2	2	2 1/2
Price, MalePer Doz Price, Male and Female Per Doz	3.50	3.50	5.00	9.00	10.00	14.00 14.00	28.00 28.00

PLATE 842

HOSE MENDERS



PLATE 843

SizeInches	$\frac{1}{2}$	3/4	. 1
Brass Per Dozen	1 20	1 20	2 00
Iron, Bronzed. Per Dozen	.40	.50	1.00



STEAM HOSE COUPLINGS



PLATE 836

SizeInches	1/2	3/4	1	11/4	1 1/2	2	2 1/2
With Iron Pipe Thread Per Dozen	15.00	15.00	18.00	24.00	30.00	42,00	72,00

Parts of Hose Couplings: Female, two-thirds of complete Coupling; Male, one half of complete Coupling.

HOSE COUPLINGS



PLATE 837

SizeInches	1/2	3/4	1	11/4	11/2	2
Price	$\frac{2.40}{2.65}$	$\frac{2.40}{2.65}$	4.40 4.65	10.00 10.50	14.00 15.00	24.00 26.00

HOSE COUPLINGS, WITH LUGS

SizeInches	11/4	1 1/2	2	$2\frac{1}{2}$
Price Per Dozen	10.00	14.00	24.00	48.00
For Iron Pipe. Per Dozen	10.50	15.00	26.00	50.00

Note.—Unless otherwise ordered, Couplings ½ inch to 2½ inch, inclusive, will always be furnished cut to Standard Hose Gauge.

LAWN HOSE CLAMPS



PLATE 838

Size of HoseInch	nes 3	1/2-3	1/2-4	3/4-3	3/4-4
List PricePer Doz	zen	. 60	.60	.60	. 60

WATER HOSE CLAMPS

Size of HoseInches	1-2	1-3	1-4	1 1/4-3	11/4-4	1 1/2-3
List Price Per Dozen	2.00	2.00	2.00	2.50	2.50	3.00

Size of HoseInches	$1\frac{1}{2}-4$	2-3 & 4	21/4-3 & 4	2 1/2-3 & 4	3-3 & 4
List Price Per Dozen	3.00	4.00	6.50	7.00	10.00

STEAM HOSE CLAMPS

Size of HoseInches	34-3	$\frac{3}{4}$ -4	1-3	1-4	1 1/4-3	$1\frac{1}{4}-4$
List PricePer Dozen	2.00	2.00	2.50	2.50	3.00	3.00

Size of HoseInches	1 1/2-3 & 4	1 ½-5	2-3 & 4	2-5	2 1/2-3 & 4	2 ½-5
List Price Per Dozen	3.50	4.00	5.50	6.50	8.50	9.50

UNDERWRITER EQUIPMENT FOR MILL AND HYDRANT HOUSES

FIRE AXES



PLATE 4062A

 Flat Head
 per doz.
 40.00

 Pick Back
 per doz.
 48.00

HOSE SPANNERS



PLATE 4063A

 American.
 per doz.
 12.00

 Tabor (as shown).
 per doz.
 12.00

FIRE HOOKS



PLATE 4064A

Length, Feet	For Buildings	For Fire Departments
6 8 10 12 14	4.00 4.50 5.00 5.50 6.50	7.00 8.00 9.00 10.50
16 18 20	6.50	12.00 14.00 16.00 18.50
$\begin{array}{c} 22 \\ 24 \\ 26 \end{array}$		21.00 24.00 28.00

STEEL CROWBARS



PLATE 4065A

Steel painted	
Steel, painted. F. D. Steel, with Ring	6.00
F. D. Steel, with Ring	12.00



FIRE BUCKET TANKS UNDERWRITER APPROVED



PLATE 4068

This Tank, which is constructed of heavy galvanized iron, then japanned red, is so arranged that each bucket handle rises automatically as wanted. This Tank is also fitted with air tight cover to prevent evaporation.

Beside this, when required, we furnish nonfreezing compound.

No.	1,	25-gallon	capacity.									16.00
No.	2,	40-gallon	capacity.						×			18.00

FIRE PAILS



PLATE 4069 ROUND BOTTOM

10	quart.								per	doz.	6.75
1	quait.								per	COZ	7 95
14	quart.							Ġ.	per	doz.	7.50



PLATE 4070 FLAT BOTTOM

10									-	_	
10	quart.					×			per	doz.	4 50
14	quait.								nor	don	5 00
14	quart.	-				×	¥		per	doz	5 50



PYRENE FIRE EXTINGUISHERS

FOR HOME, FACTORY AND GENERAL USE



PLATE 6986

Brass Extinguishereach	10.00
Brass Extinguisher	10.50
Nickel Extinguisher	1.50
Liquidper gallon	5.00
Liquid. each Wall Brackets, galvanized each Vehicle Brackets, steel, galvanized or enameled, black, blue and red. each each	.25
Wall Brackets, galvanized each look blue and red each	. 50
Vehicle Brackets, steel, galvanized or enameled, black, black and reach	.75
Vehicle Brackets, steel, galvanized of chambers, seed. Vehicle Brackets, brasseach	1.00
Vehicle Brackets, brass	

	Metal	Wood
Boxes for (1) Extinguishereach Boxes for (2) Extinguisherseach Boxes for (3) Extinguisherseach		1.50 2.00 2.50

Pyrene is a part of U. S. Government Mine Exhibit at Panama Exposition. Extensively used in coal mining districts of Pennsylvania and West Virginia.



UNDERWRITER FIRE EXTINGUISHER OPEN BOTTLE TYPE



3-gallon,	Polished Copper	15.00
3-gallon,	Red Japanned	15.50
3-gallon,	Nickel-Plated	16.00

This Extinguisher carries with it not only the Underwriters' approval, but also our broadest guarantee as to its efficiency, quality, and finish.

PLATE 4066

RAIL—MARINE EXTINGUISHERS BOTTLE BREAKING TYPE



PLATE 4067

3-gallon,	Polished Copper 15.00
3-gallon,	Red Japanned
3-gallon,	Nickel-Plated

The type of machine shown opposite is particularly adapted to railroad and steamship interests, owing to its special construction. This consists of plunger head and heavy acid cage. To operate, invert and strike plunger against floor, thus breaking bottle and generating an effective stream instantly. Also, owing to its non-evaporative and non-tilting features, this machine invariably maintains its full efficiency under any condition.

EXTINGUISHER CHARGES

For aboveper doz. 6.0	For	above.																								. per	doz.	6.0)()
-----------------------	-----	--------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	-------	------	-----	----	---



S. M. & S. Co. MERCURY OPEN HEARTH IRON



PLATE 7987

The Open Hearth or boiling process of making iron differs from others in that it is the only one used in this country which practically removes the undesired Phosphorus and Sulphur and yet controls the amount of Carbon. In manufacturing iron by the Open Hearth method the mixture is always under control, and the exact product of the resultant iron can always be determined. This iron is made for service and has given our customers universal satisfaction.

Method of Manufacture

In manufacturing iron by the Open Hearth process the basic Open Hearth or charge is metted down and boiled in a furnace constructed of highly refractory material. This process is virtually a revision to first principles, although method and equipment are essentially different from the old time puddling process. Puddling furnaces were a crude form of Open Hearth furnaces now in use and, in addition to being of a very limited capacity, as well as expensive to operate, their structure could not withstand the intense heat necessary for the purification of the metal.

Method of Testing

In manufacturing Open Hearth iron it is the practice to test each heat or charge at intervals in order to ascertain the exact quality and, if desired, make any change necessary before pouring. This is an advantage not possible in any other method of making iron. By this process the Phosphorus and Sulphur are practically removed and the content of Carbon controlled to the fraction of a point making possible a pure iron of any degree of hardness. Low Carbon Iron made by the Open Hearth process is what might be termed "A Highly Refined Grade of Iron, of Greater Ductility, Purer and of a Finer Grain than can be Produced by the Old-Fashioned Puddling Operation."

Ductility

Brittleness so often found in other brands of iron is lacking in iron made by the boiling process or Open Hearth method. Every charge for the Open Hearth is made up to specification, governed by the purpose for which the finished iron is finally to be used and the heat is not drawn until tests show that the desired analysis has been attained.

OUR S. M. & S. Co. OPEN HEARTH IRON is made in specially constructed furnaces for the purpose for which it is intended and we can recommend it to be equal, if not superior, to anything now on the market in this line.

We solicit your inquiries and orders.

Prompt shipments either from stock or mill.



MERCURY GALVANIZED OPEN HEARTH FLAT SHEETS Bundling Table and Weight per Sheet and per Bundle in Pounds

Ga'ge		16			18			20			22		24		
Size of Sheet	Weight of Sheet	Weight of Bdle.	Number of Sheets	Weight of Sheet	Weight of Bdle.	Number of Sheets	Weight of Sheet	Weight of Bdle.	Number of Sheets	Weight of Sheet	Weight of Bdle.	Number of Sheets	Weight of Sheet	Weight of Bdle.	Number of Sheets
24x96 26x96 28x96 30x96 36x96	42.5 46.0 49.6 53.1 63.7	170 138 149 159 127	4 3 3 3 2	34.5 37.4 40.3 43.1 51.8	138 149 161 129 155	4 4 4 3 3	26.5 28.7 30.9 33.1 39.7	143	6 5 5 5 4	22.5 24.4 26.3 28.1 33.9	157 146 157 141 169	6 5	18.5 21.0 21.6 23.1 27.7	148 160 151 162 166	8 7 7
Ga'ge		26			27			28			29			30	
24x96 26x96 28x96 30x96 36x96	14.5 15.7 16.9 18.1 21.7	145 157 152 145 152	10 10 9 8 7	13.5 14.6 15.7 16.9 20.2	148 146 157 152 162	11 10 10 9 8	12.5 13.5 14.6 15.6 18.8	150 149 146 156 150	12 11 10 10 8	11.50 12.46 13.41 14.37 17.25	150 148 144	12 11 10	10.5 11.4 12.2 13.1 15.8	157 148 147 144 157	15 13 12 11 10

MERCURY OPEN HEARTH FLAT BLACK SHEETS



PLATE 7988

Puralling Table and Weight per Sheet and per Bundle in Pounds

	Bu	ındli	ng T	able ar	d W	eigh	t per 5	neet	and	per Bu	inai	e in i	rounds	,	
_	24	x 96	-	20	3 x 9	6	28	x 96	3	30		3	36	x 96	
Gauge	Weight of Sheet	Number of Sheets	Weight of Bdle.	Weight of Sheet	Number of Sheets	Weight of Bdle.	Weight of Sheet	Number of Sheets	Weight of Bdle.	Weight of Sheet	Number of Sheets	Weight of Bdle.	Weight of Sheet	Number of Sheets	Weight of Bdle.
10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29	90. 80. 70. 60. 50. 45. 40. 36. 32. 28. 24. 22. 18. 16. 11. 10. 9.	2 2 2 2 3 3 4 4 5 5 6 7 7 8 9 10 12 13 15 16 16 17 18 18 18 18 18 18 18 18 18 18 18 18 18	180 160 140 120 150 135 160 144 154 144 140 144 143 150 144	43.33 39. 34.67 30.33 26. 23.83 21.67 19.5 17.33 15.17 13. 11.92 10.83 9.75	2 2 2 2 3 3 3 4 4 5 6 6 6 7 8 9 10 11 11 11 11 11 11 11 11 11 11 11 11	195 173 152 130 162 146 130 152 156 143 152 156 152 143 143 143 143 144	37.33 32.67 28. 25.67 23.33 21.	2 2 2 3 3 3 4 4 4 5 5 6 6 6 7 8 9 11 11 12 13 13 14 14 14 15 16 16 16 16 16 16 16 16 16 16 16 16 16	187 163 140 175 157 140 168 149 163 140 154 147 147 154 154 154 154 154 154 154 154 154 154	75. 62.50 56.25 50. 45. 40. 35. 27.50 25. 22.50 20. 17.50 15. 12.50 12.50 11.25	2 3 3 4 4 5 6 6 7 7 8 10 11 12	175 150 125 169 150 140 150 140 150 157 140 150 151 150 146	54. 48. 42. 36. 33. 30. 27. 24. 21. 18. 16.50 15.	2 3 3 4 4 5 5 6 6 7 8 9 10	180 150 135 120 162 144 165 150 162 144 147 148 150 148



MERCURY GALVANIZED OPEN HEARTH ROOFING PRODUCTS

We show on the following pages a full line of Mercury Open Hearth Roofing Products with which we have been furnishing the trade for a considerable length of time and desire to call the trades' attention to the process of manufacture of this material.

PROCESS OF MANUFACTURE

All of this material is made by the Open Hearth or Boiling Process by which the charge can be tested before drawing from the furnace and any impurities detected. Each Charge is made up to meet the requirements to which the finished product is to be put and we feel, in presenting this line to the trade, that we are furnishing material second to none.

We solict your inquiries and orders on the above.

Prompt shipments can be made either from Stock or Mill.

11/4 INCH CORRUGATED



PLATE 7989

In Sheets 5, 6, 7, 8, 9, 10 or 12 foot lengths. Standard Weights per Square. (Pounds)

Gauge	29	28	27	26	25	24	23	22	21	20
Painted Galvanized	82	72 87	79 94	86 101	100	114 129	128	142 157	156	170 185

21/2 INCH CORRUGATED



PLATE 7990

In Sheets 5, 6, 7, 8, 9, 10 or 12 foot lengths. Standard Weights per Square. (Pounds)

Gauge	29	28	27	26	25	24	23	22	21	20	18	16	14	12
Painted	7 9	68 85	76 91	83 98	96 111	110 124	123 138	136 151	150 165	163 178	217 232	271 286	339 354	474 488

The above can also be furnished in 2, 3 or 5 inch Corrugations.



MERCURY OPEN HEARTH ROOFING PRODUCTS

PRESSED BRICK SIDING



PLATE 7991

In Sheets 28 in. x 60 in.

Standard Weights per Square. (Pounds)

Gauge	28	27	26
Painted	64	71	77
	78	85	91

ROCK FACE BRICK SIDING



PLATE 7992

Size of Brick, 2 4-5 in. by 81/4 in. Size of Sheet, 28 in. x 60 in.

Standard Weights per Square. (Pounds)

Gauge	28	27	26
Painted Galvanized.	65	72	78
	79	86	92



MERCURY OPEN HEARTH ROOFING PRODUCTS

ROCK FACE STONE SIDING



PLATE 7993

Size of Stones, 7 in. x 12 in. or 9 1-3 in. x 20 in. Size of Sheets, 28 in. x 60 in.

Standard Weights per Square. (Pound	le	١
-------------------------------------	----	---

Gauge	28	27	26
PaintedGalvanized	65	72	78
	79	86	92

BEADING CEILING OR SIDING

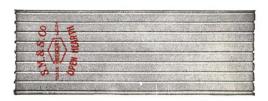


PLATE 7994

Covering Width 24 Inches. Made in lengths 5, 6, 7, 8, 9, 10 and 12 foot.

Standard Weights per Square. (Pounds)

Gauge	28	27	26	24
Painted .	70	76	83	110
Galvanized	85	91	98	125

MERCURY OPEN HEARTH ROOFING PRODUCTS

V-CRIMP ROOFING



PLATE 7995

V-Crimped Roofing made in length 5, 6, 7, 8, 9, 10 and 12 foot.

Can be furnished with Sticks if desired.

Standard Weights per	Squa	re. (P	ounds)		
Gauge	28	27	26	24	22	20
Painted Galvanized	70 85	76 91	83 98	110 125	137 152	164 179

Sticks for V-Crimped, add 4 lbs. per square.

THREE V-CRIMP ROOFING



PLATE 7996

Three V-Crimped Sheets made in lengths 5, 6, 7, 8, 9, 10 and 12 foot.

Can be furnished with Sticks if desired.

Standard Weights per	Squar	re. (P	ounds)			
Gauge	28	27	26	24	22	20
Painted	72 88	79 95	86 102	114 130	142 158	170 186

Sticks for 3 V-Crimped, add 8 lbs. per square.

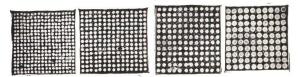
TIN BRIGHT



We carry a complete stock of Coke and Charcoal Tin, regular sizes and thicknesses and we solicit your orders.

TIN PERFORATED

Made of full weight Bright Plates, Sheets 14 x 20.



No. 1

No. 2 PLATE 7998 No. 3

No. 4

Numbers	1	2	3	4	5	6
Perforations per lineal inch	18	15	12	10	8	7

Per dozen, net..... Special price per box.

Per Shest, net.....

SHEET

Leading Sizes. Lowest Market Price per Pound.

SCHEDULE OF WEIGHT PER SHEET



U. S. Standard Gauge No	26, 27	25	24	23
M. & H. Zinc Gauge No	9	10	11	12
24 x 84 inches. 30 x 84 inches. 32 x 84 inches. 36 x 84 inches.	11.7 12.5 14.1	10.5 13.1 14.0 15.7 17.5	12.6 15.8 16.8 18.9 21.0	14.7 18.4 19.6 22.0 24.5
42 x 84 inches. 48 x 84 inches. 52 x 84 inches.	16.4 18.8	18.4 21.0 22.7	$22.0 \\ 25.2 \\ 27.3$	25.7 29.4 31.8

Zinc Gauge can be maintained only approximately.

PLATE 7999



SHEET BRASS

HARD AND SOFT

TABLE SHOWING WEIGHT PER SQUARE FOOT AND PER SHEET

Size of Sheets, 24 x 48 inches.

Thickness	in.	$ \frac{\frac{3}{16}}{\text{in.}} $	10 Ge.	12 Ge.	14 Ge.	16 Ge.	18 Ge.	20 Ge.	22 Ge.	24 Ge.	26 Ge.	28 Ge.	30 Ge.
Weight per sq ft., lbs. Weight per Sheet, lbs.	$\frac{11.07}{88\frac{1}{2}}$	8.30 66½	5.58 44 ³ ⁄ ₄	$\frac{4.54}{36\frac{1}{4}}$	$\frac{3.50}{28}$	$\frac{2.80}{22\frac{1}{2}}$	$\frac{2.10}{16\frac{3}{4}}$	$\frac{1.57}{12\frac{1}{2}}$	1.22	.96	.78	.64	.55

IRON WIRE

SOFT, ANNEALED, BRIGHT, GALVANIZED AND COPPERED

IMPERIAL STANDARD WIRE GAUGE

Weight, breaking strain and decimals of an inch.

		Weight	Length	Breaking strain.	Breaking strain.	Correspo	nding Size
GAUGE	Decimals of an inch	per mile	per 100 lbs. Yards	Bright iron wire Lbs.	Annealed iron wire Lbs.	Birming- ham Gauge	B. and S. Gauge
0000	.400	2179	81	10052	6702	.454	.460
000	.372	1885	94	8694	5796	.425	.410
00	.348	1649	107	7608	5072	.380	.365
0	.324	1429	123	6595	4397	.340	.325
1	.300	1225	144	5655	3770	.300	.289
2 3 4 5 6 7 8	.276	1037	170	4785	3190	.284	.258
3	.252	864	203	3990	2660	.259	.229
4	.232	732	240	3381	2254	.238	.204
5	.212	612	288	2824	1883	.220	.182
6	.192	502	351	2316	1544	.203	.162
7	.176	422	417	1946	1298	.180	.144
8	.160	348	505	1608	1072	.165	.128
	.144	282	625	1303	869	.148	.114
10	.128	223	787	1030	687	.134	.102
11	.116	183	961	845	564	.120	.091
12	.104	148	1190	680	454	.109	.081
13	.092	114	1538	532	355	.095	.072
14	.080	81	2000	402	268	.083	.084
15	.072	70	2500	326	218	.072	.057
16	.064	56	3125	257	172	.065	.051
17	.056	42	4197	197	131	.058	.045
18	.048	32	5555	145	97	.049	.040

Average weight of bundles, 65 lbs.

Stove pipe wire No. 19 in 1/4 lb. Hanks, Bundles of 25 lbs.



HOT ROLLED SHEET COPPER

EXTRAS OVER BASE PRICE

Size	e of Sheets	and	32 oz. to 64 oz.	to	to 1	15 oz.	14 oz.	13 ez.	12 oz.	11 oz.	10 oz.	9 oz.	8 oz.	Lig'r than 8 oz.
Width	Length Inches	Ce	ents pe	r Pou	nd		(Cents	per Po	ound (ver B	ase		
Inches	Not longer than 72	Base	Base	Base	Base	.001/2	.01	$.01\frac{1}{2}$.02	$.02\frac{1}{2}$.03	$.04\frac{1}{2}$.06	. Ura
Not wider	Longer than 72 Not longer than 96	Base			Base	.601/2	.01	.02	. 03	.041/2	.06	.07½	.09	
than 30	Longer than 96 Not longer than 120	Base		001/2	.01	.02	. 03	05	.07					
	Longer than 120	Base		Base	Base	01	02	.03	.04	.06	08	10	.12	
	Not longer than 72	Base	B. se	Dase	Dase	.01	.02	.09	, UT		- 17.0			
30 but	Longer than 72 Not longer than 96	Base	Base	Base	Base	.01	.02	.04	.06	.08	. 10			
not wider than 36	Longer than 96 Not longer than 120	Base	Base	.01	.02	.03	.04							X 40X 40X
	Longer than 120	Base	.01	.02	0.00	03	. C4	06	08	()9	.11			
	Not longer than 72	Base	Base	.01	.02	.00		.00	.00	10000				
36 but	Longer than 72 Not longer than 96	Base	Base	.01	.03	04	.05	. 07	.09					
than 48 No	Longer than 96 Not longer than 120		_	.02	.04	.06	.09						2 1 2	
	Longer than 120	Base		01	03	.05	.07	09	11			10.00		
*	Not longer than 72	Base	Base	.01	.00	.00	. 04			1.0				
Wider than 48 but	Not longer than 96	Base	Base	. 02	. 04	.07	. 10							101
not wider than 60	Longer than 96 Not longer than 120			03	.06							F 25 10		
	Longer than 120	.01	. 02	.04	.08				V 10 8		100 100			
Wider than 60 but	Langer than 96	Base		-				022 20						
not wider	Not longer than 120			.05	. 10		_	1 101 05	- 2	-	-	1	S 11 0	
than 72	Longer than 120	.01	03	.08		-		-		-				
Wider than	Not longer than 96 Longer than 96	.01	.05	.00		202.20		200 200						
72 but not wider	Not longer than 12		.04	07			N.C.	0.88			10	1		
than 108	Longer than 120	.03	.05				1 10			- 1.0				
Wider than	Not longer than 12	0.04	.06			10.11	-	-	-	-				
108 but not wider than 120	Longer than 120	. 05	.08					×	0 0 0 0					
Wider that 120 but	Not longer than 13	2 06	. 09											
not wider than 132	Longer than 132	.07						2						
Wider tha 132	n	08			J	J				J		J		

The longest dimension of any sheet shall be considered its length.



BRASS AND COPPER, WIRE AND RODS

In ordering be sure to specify exact size required either by gauge or in parts of an inch, making clear what gauge is being used.

Rods in regular stock or mill lengths of from 8 to 12 ft. will be shipped unless special lengths are given.

Wire will be furnished in regular stock size coils since we do not make a practice of breaking coils.

The following sizes and kinds are carried in stock for immediate shipment.

BRASS SPRING WIRE IN 5 AND 10 LB. COILS

Nos. 3 to 24 B. & S. Gauge both inclusive

SOFT BRASS WIRE IN 5 AND 10 LB. COILS

Nos. 10, 12, 13, 16, 18, 20, 21, 22 Stubs Gauge

COPPER WIRE IN 5, 10 AND 25 LB. COILS

INCHES

3/8, 5, 1/4

Nos. 4 to 26 Stubs Gauge both inclusive

ROUND BRASS RODS

INCHES

SQUARE BRASS RODS

INCHES

 $\frac{3}{16}$, $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{7}{16}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$, 1

HEXAGON BRASS RODS

INCHES

 $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{7}{16}$, $\frac{1}{2}$, $\frac{9}{16}$, $\frac{5}{8}$

ROUND COPPER RODS

INCHES

3/8, 1/2, 5/8, 3/4, 7/8, 1, 1 1/8, 1 1/4, 1 1/2, 2



Brass and Bronze Rods, Angles and Channels

Brown & Sharpe's Gauge, the Standard

BRASS AND BRONZE RODS

Extras Over Base Price

Prices are for 100 pounds or more of one item in one order.

SizeNo.	11 to ½ inch	$\frac{1}{8}$ to $\frac{3}{16}$ inch	$\frac{3}{16}$ to $\frac{3}{8}$ inch	$\frac{3}{8}$ to 2 inch
Round Hexagon, octagon and square Rectangular and half round	$.08\frac{1}{2}$.02 .04 .06	$00\frac{1}{2}$ $02\frac{1}{2}$ $04\frac{1}{2}$	Base .02 .04

Sizes 2 inches and larger, special prices on application.

Prices of rectangular and half round are governed by thinner dimensions.

Shapes other than listed above, special prices on application, not less than prices of rectangular and half round.

Rods cut to uniform specific lengths, 2 feet and over, list advance .01.

Rods cut to uniform specific lengths, less than 2 foot, add the following list advances:

LengthInches	1 to 2	2 to 4	4 to 6	6 to 9	9 to 12	12 to 24
List advance	.12	.08	.05	.04	.03	.02

Shorter than 1 inch, special prices on application, not less than .12 list advance. Smaller than No. 11, see wire list.

BRASS AND BRONZE ANGLES AND CHANNELS

Extras Over Base Price

Angles, plain and of one angle; channels, plain and of three sides only; half round and half oval only.

Prices are for 100 pounds or more of one item in one order.

Width of widest dimension	Nos. 8 to 10	Nos.10 to 12	No. 12 $\frac{1}{16}$ in.	$\frac{1}{16}$ inch to No. 19 incl.	No. 20	No. 21	No. 22	No. 23	No. 24
3/8 to 3/4 inch 3/4 to 1 1/2 inch 1 1/2 in. and over	.06	.06 .04 .06	.04	.02 Base .02	.03 .01 .03	.05 .03 .05	.07 .05 .07	.09 .07 .09	.12 .10 .12

Thicker than No. 8 or narrower than $\frac{3}{8}$ inch, special prices on application. Shapes other than listed, special prices on application.

ANGLES AND CHANNELS CUT TO UNIFORM SPECIFIC LENGTHS

LengthInches	1 to 2	2 to 4	4 to 6	6 to 12	12 to 96	96 and over
List advance	.06	.04	.03	.02	No charge	.01

Shorter than 1 inch, special prices on application, not less than .06 list advance.



WEIGHT OF BRASS ROD AND DECIMAL EQUIVALENTS

WEIGHT OF BRASS ROD

Size	Weight,	Pounds	Size	Weight,	Pounds	Size	Weight,	Pounds
Ins.	Round Square Bars 1 Ft. Long Long		Inches	Round Bars 1 Ft. Bars 1 Ft. Long Long		Inches	Round Bars 1 Ft. Long	Square Bars 1 Ft. Long
16/8 11/46/6/8 7/6/2 9/16/43/6/8 11/6/8 11/6 11/6	.01132 .04527 .1019 .1811 .2829 .4074 .5545 .7243 .9167 1.132 1.369 1.63 1.913	.01441 .05764 .1297 .2306 .3603 .5187 .7061 .9222 .1.167 1.441 1.744 2.075 2.435	$\begin{array}{c} 1\\1\\1\\1\\1\\1\\1\\1\\8\\1\\1\\1\\4\\1\\1\\1\\1\\1\\1\\1\\$	2.546 2.897 3.271 3.667 4.085 4.527 4.991 5.477 5.987 6.519 7.073 7.65 8.25	3.242 3.689 4.164 4.669 5.202 5.764 6.354 6.974 7.623 8.3 9.006 9.741 10.51	1 136 1 17/556 1 1 16 2 1/4/8 2 1/5/8 2 1/5/8 2 1/5/8 2 1/5/8 2 1/5/8 2 1/5/8 2 1/5/8 3 1/5/8	9.518 10.19 10.88 11.59 13.08 14.67 16.34 18.11 19.96 21.91 23.95 26.07	12 12 12 97 13 85 14 76 16 66 18 68 20 81 23 06 25 42 27 9 30 49 33 2
7/8	2.218	2.824	1 3/4	8.873	11.3			

For weights of hexagon and octagon rods, take weight of round and square, add together and divide by two.

Specific gravity—8.509.

Weight per cubic inch-.3074 pound.

Weight per cubic foot-531.1 pounds.

These weights are theoretically correct but variations must be expected in practice.

TABLE OF DECIMAL EQUIVALENTS

Fraction	Decimal	Fraction	Decimal	Fraction	Decimal	Fraction	Decimal	
8t	hs	32	32nds		ths	64ths		
0/4/8/19/19/19/19/19/19/19/19/19/19/19/19/19/	.125 .25 .375 .5 .625 .75		.03125 .09375 .15625 .21875 .28125 .34375 .40625	14 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	$\begin{array}{c} .015625 \\ .046875 \\ .078125 \\ .109375 \\ .140625 \\ .171875 \\ .203125 \end{array}$	33.4 33.647.65.647.65.65.647.65.65.65.65.65.65.65.65.65.65.65.65.65.	.515625 .546875 .578125 .609375 .640625 .671875 .703125	
1 1	16ths		.46875 $.53125$ $.59375$	15 64 17 64 19	.234375 $.265625$ $.296875$	47 64 49 64 51	.734375 $.765625$ $.796875$	
16 3 16 5 16 7 16 9 16 11 16 13 15 15 15 16	.0025 .1875 .3125 .4375 .5625 .6875 .8125	(3.21-)(23-5)(24-5)(24-7)(24-5)(24-7	.65625 .71875 .78125 .84375 .90625	641 643 645 645 647 641 641 641	.328125 .359375 .390625 .421875 .453125 .484375	(\$15)(\$15)(\$17)(\$20)(\$17)(\$20) (\$15)(\$15)(\$15)(\$15)(\$15)(\$25) (\$15)(\$15)(\$15)(\$15)(\$15)(\$15)(\$15)(\$15)	.828125 .859375 .890625 .921875 .953125 .984375	

SHEET BRASS

When ordering be sure to give the width of sheet desired.

Regular stock lengths of from 8 to 12 ft. will be shipped unless otherwise ordered.

State thickness by gauge, Browne & Sharpe being standard. If other gauge is used be sure to mention same.

The tempers commonly used in ordering sheet brass are half hard, hard, soft and spring.

The following sizes are carried in stock for immediate shipment:

SOFT BRASS, B. & S. GAUGE, IN ROLLS

GAUGE	WIDTH IN INCHES
No. 20	8, 10, 12, 14, 16, 18
No. 21	8, 10, 12, 14, 16, 18
No. 22	8, 10, 12, 14, 16, 18
No. 23	8, 10, 12, 14, 16, 18
No. 24	8, 10, 12, 14, 16, 18
No. 25	8, 10, 12, 14, 16, 18
No. 25	8, 10, 12, 14, 16, 18
No. 27	8, 10, 12, 14, 16, 18
No. 28	8, 10, 12, 14, 10, 10
No. 29	8, 10, 12, 14, 16, 18
No. 30	8, 10, 12, 14, 16, 18
No. 31	8, 10, 12, 14, 10, 10
No. 32	112, 14, 10, 10
No. 33	
No. 34	
No. 35	12, 14, 16, 18

SPINNING BRASS, IN ROLLS

GAUGE	WIDTH IN INCHES
No. 20	8, 10, 12, 14, 16
No. 22	8, 10, 12, 14, 16
No. 24	12, 14, 16
No. 25	
No. 26	

SOFT FLAT BRASS

GAUGE	WIDTH	IN	INCHES
NT. 10		19	

FLAT BRASS, HALF HARD, B. & S. GAUGE

GAUGE	WIDTH IN INCHES
3/8	8, 10, 12
$\frac{\frac{5}{16}}{\frac{1}{4}}$	0, 10, 14
$\frac{3}{16}$ (No. 5)	8, 10, 12 8, 10, 12, 14, 16, 18, 20
$\frac{3}{32}$ (No. 10)	8, 10, 12, 14, 16, 18, 20
No. 5	8, 10, 12, 14, 16, 18, 20 8, 10, 12
No. 6	
No. 10	12, 14
No. 11 No. 12	12
No. 14	8, 10, 12, 14, 16, 18, 20 8, 10, 12, 14, 16, 18, 20
No. 16	8, 10, 12, 14, 16, 18, 20
No. 18	8, 10, 12, 14, 16, 18, 20 8, 10, 12, 14, 16, 18, 20
No. 19	8, 10, 12, 14, 16, 18, 20 8, 10, 12, 14, 16, 18, 20
No. 21	12, 14
No. 22 No. 24	. 12
No. 25	10, 12

ROLL AND SHEET BRASS, BRONZE, OREIDE AND GILDING

Brown & Sharpe's Gauge, the Standard

Prices are for 100 pounds or more of one item of sheet metal in one order.

	than	2	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38
includi		10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
To and Including	Thick- ness Inches					E	ctras C	ver B	ase Pr	ices							
No. 20	.0319		1.001/2		.03	.05	.07	.09	1.11	.14	1.17	. 20	1.24			.38	
No. 21 No. 22	0.0284 0.0253	Base Base		$02\frac{1}{2}$ $02\frac{1}{2}$.04	.06	.08	.10	.12	.15	.18	.21	. 25			.39	
No. 23	.0225	Base	.01	.021/2	.04	.06	.03	.10	.12	.15	.18	.21	. 25	. 29	.34	.39	
No. 24 No. 25	.0201 $.0179$	Base .01	.01	$02\frac{1}{2}$ $03\frac{1}{2}$.04	.06	.08	.10	.12	.15	.18	.21	25		.34	.39	
No. 26	.0159	.61	.02	$.03\frac{1}{2}$.05	.07	.09	.11	.13	.16	.19	.22					
No. 27 No. 28	.0142 $.0126$.01	$02\frac{1}{2}$.06	.08	.10	.12	.14	.17	.20	. 23		100		0.000	
No. 28 No. 29	.0112	.011/2		.041/2		001		.121/2						-			
No. 30	.0100	.02	.031/2	.05	.07	.09	.11	.13	.15	.18	.21	. 24					
No. 31 No. 32	.0089	.021/2	.041/2	051/2	$.07\frac{1}{2}$	$09\frac{1}{2}$	$\frac{.11\frac{1}{2}}{.12}$.131/2	.16	$.18\frac{1}{2}$				4CF X			
No. 33	.0071	.04	.051/2	.07	.09	.11	.13	.15									
No. 34 No. 35	.0063	.05	.061/2	.08	.10	131/	.14	.16									
No. 36	.0050	.08	.091/2		.13	.15	.17	My ten property									

All metal heavier than No. 6 gauge, listed and charged as sawed metal whether sheared, slit or sawed. Metal between gauges takes price of nearest gauge.

Circles cut from above metal, over 6 inches and not exceeding 12 inches in diameter, No. 10 gauge and thinner, list advance .06. Over 6 inches and not exceeding 12 inches in diameter, thicker than No. 10 gauge, list advance .10. 6 inches and smaller and larger than 12 inches in diameter, special prices on application.

Segments, pattern sheets and irregular shape blanks, special prices on application. Embossed metal, list advance .04.

Polished one side, No. 16 and heavier, advance per pound .04. Polished one side, lighter than No. 16, advance per square foot .10. Polished both sides, double the above prices.

Sheet metal, extra leveled, special prices on application.

Sheet metal, 14 inches wide and narrower, cut to uniform specific lengths, add the following list advances: 1 foot to 4 feet, .01; 4 feet to 6 feet, .02; 6 feet to 8 feet, .04; 8 feet to 10 feet, .06; 10 feet and over, special prices on application, not less than .06 list advance.

Sheet metal, 14 inches wide and narrower, cut to specific lengths of less than 24 inches or any multiple thereof, no charge for cutting.

Sheet metal, 14 inches wide and narrower, cut to specific lengths shorter than 12 inches, special prices on application, not less than .01 list advance.

Sheet metal, wider than 14 inches, cut to uniform specific lengths, special prices on application, not less than prices for cutting 14 inches wide.



ROLL AND SHEET BRASS, BRONZE, OREIDE AND GILDING

Brown & Sharpe's Gauge, the Standard

SLITTING METAL

Extras Over Base Prices

Prices are for 100 pounds or more of one item of slit metal in one order.

From number To and including number	6	16	20	29	33 and
	15	19	28	32	thinner
Over ½ inch to 2 inches wide, inclusive Over ¼ inch to ¼ inch wide, inclusive ¼ inch wide and narrower	.01	.01	.01 .02 .06	.01 ½ .03 .12	.03 .06 .18

SLIT METAL CUT TO UNIFORM SPECIFIC LENGTHS 2 FEET AND OVER

Number	21 to 25 incl.	26 to 30 incl.	31 to 35 incl.	36 to 38 incl.
Over ½ in. to 2 in. wide, inclusive, list advance Over ¼ in. to ½ in. wide, inclusive, list advance		.04	.06	.10

Slit metal, $\frac{1}{4}$ inch and narrower, cut to uniform specific lengths, special prices on application, not less than the price for corresponding gauges in widths over $\frac{1}{4}$ inch to $\frac{1}{4}$ inch wide.

Slit metal cut to uniform specific lengths, shorter than 2 feet, special prices on application, not less than the price for corresponding widths and gauges.

No slit metal thinner than 20 gauge, 2 inch and narrower, furnished in flat random lengths, without the extra charge for cutting as above.

Drawn strips, above price of slit brass, list advance .04.

Drawn strips are all metal drawn in dies wider than ¾ inch to 2 inch inclusive, thinner than ⅓ inch but not thinner than .032 inch.

SAWING METAL

Extras Over Price of Metal of Corresponding Width

Prices are for 100 pounds or more of one item of sawed metal in one order.

Over. Inches To and including. Inches	6 40	3 6	$\frac{1}{3}$	$\frac{1}{2}$	1/2 and narrower
List advance	.02	.03	.04	.05	.08

Sawed metal cut to uniform specific lengths, add the following list advances:

LongthIns.	1 to 2	2 to 4	4 to 6	6 to 9	9 to 12	12 to 24	24 to 48	48 to 72	72 to 96	96 to 120
List advance	.12	.10	.09	.08	.07	.06	.05	.06	.08	.10

Shorter than 1 inch, special prices on application, not less than .12 list advance.

10 feet and over, special prices on application, not less than .10 list advance.

All metal heavier than No. 6 gauge, listed and charged as sawed metal, whether sheared, slit or sawed.



WEIGHT OF SHEET BRASS AND BRASS WIRE

WEIGHT OF SHEET BRASS

Brown & Sharpe Gauge

No.	Weight Per Square Foot Pounds	No.	Weight Per Square Foot Pounds	No.	Weight Per Square Foot Pounds	No.	Weight Per Square Foot Pounds
0000	20.37	8	5.69	19	1.589	30	.4441
000	18.14	9	5.066	20	1.415	31	. 3953
00	16.15	10	4.512	21	1.26	32	.352
0	14.39	11	4.018	22	1.123	33	.3135
1	12.81	12	3.578	23	.9994	34	.2792
2	11.41	13	3.186	24	.8901	35	.2486
3	10.16	14	2.838	25	.7926	36	.2214
4	9.047	15	2.527	26	.7059	37	.1972
5	8.055	16	2.25	27	.6283	38	.1756
0 1 2 3 4 5 6	7.174	17	2.004	28	.5597	39	.1564
7	6.39	18	1.785	29	.4986	40	.1393
Thick-	Weight Per	Thick-	Weight Per	Thick-	Weight Per	Thick-	Weight Per
ness	Square Foot	ness	Square Foot	ness	Square Foot	ness	Square Foot
Inches	Pounds	Inches	Pounds	Inches	Pounds	Inches	Pounds
1	2.768	9	24.91	1 1 1 6	47.05	$1\frac{9}{16}$	69.19
1/8	5.535	5/8	27.68	11/8	49.82	15/8	71.96
3	8.303	11	30.44	$1\frac{3}{16}$	52.58	114	74.72
1/4	11.07	3/4	33.21	1 1/4	55.33	1 3/4	77.49
16 1/8 3 16 1/4 5 16 3/8 7 16 1/2	13.84	9 16 55/8 11 16 3/4 16 7/8 15	35.98	$1\frac{5}{16}$	58.12	$1\frac{13}{16}$	80.26
3/8	16.61	7/8	38.75	1 3/8	60.89	1 7/8	83.03
7	19.37	15	41.51	$1\frac{7}{16}$	63.65	$1\frac{15}{16}$	85.79
1/2	22.14	1	44.28	11/2	66.42	2	88.56

Specific gravity =8.512.

Weight per cubic foot = 3075 pound.
Weight per cubic foot = 531.4 pounds.
These weights are theoretically correct, but variations must be expected in practice.

WEIGHT OF BRASS WIRE

Brown & Sharpe Gauge

No.	Weight Per Lineal Foot Pounds	No.	Weight Per Lineal Foot Pounds	No.	Weight Per Lineal Foot Pounds	No.	Weight Per Lineal Foot Pounds
0000	.6096	8	.04757	19	.003711	30	.0002898
000	. 4833	9	.0377	20	.002943	31	.0002296
00	.3834	10	.02991	21	.002333	32	.0001821
0	.3041	11	.02372	22	.001851	33	.0001444
1	.2411	12	.01881	23	.001468	34	.0001145
2	. 1912	13	.01492	24	.001164	35	.00009079
3	.1516	14	.01183	25	.000923	36	.00007202
4	.1202	15	.009383	26	.000732	37	.00005712
5	. 09532	16	.00744	27	.0005801	38	.00004529
6	.07561	17	.005901	28	.0004603	39	.00003592
7	.05999	18	.004679	29	.0003653	40	.00002849

Specific gravity = 8.461.

Weight per cubic inch = .3057 pound.
Weight per cubic foot = 528.2 pounds.
These weights are theoretically correct, but variations must be expected in practice.



STANDARD BAR IRON CLASSIFICATION

ADOPTED MARCH 1899

ROUNDS AND SQUARES

OVAL IRON

			The second secon	_
1	to	1 ½Base	% to 11/2	tra
2	to:	27 ₈	extra	i
3	to	$3\frac{1}{2}$	" 34 to 16	6
25%	to		" ½ to 🕏	
			" $\frac{3}{8}$ to $\frac{7}{16}$	
		$4\frac{1}{2}$ 1.00	" ½ to ½ x 3 1.00 "	
4%	to		% to 15 x 18	•
518	to	6	"	
61/8	to	$6\frac{1}{2}$	" HALF OVAL AND HALF ROUN	חו
		$7\frac{1}{4}$	" HALF OVAL AND HALF HOOR	
3/4	to	$\frac{7}{8}$	«	
5/	to	11	" 2½ to 3	tra
	to	9	" 7/8 to 2	
	to	$\frac{16}{132}$		"
		32	4 00 16	44
	to	32	/8 00 16	il
2.0	to	$\frac{11}{32}$	72 00 16	
1/4	to	⁹ / ₃₂	" 3/8 to 16	
32	to	— 1.40	16	
3	to	— 2.50	" 4	44

Half Ovals less than 1/4 their width in thickness extra price.

FLATS

			1.50	1
$\frac{3}{8}$ to $\frac{7}{16}$ in	1. x 1/4 to		in	XUI
1/2 to 9/16	$x \frac{1}{4}$ to	16	1.00	44
½ to 16 5/8 to 11	x 3/8 to	$\frac{1}{2}$		"
5% to 11	x 1/4 to	1.6		44
5/8 to 11/16	x 3/8 to	5/8		
3/ to 15	x 1/4 to	5	.50	**
12 to 16 1/2 to 16 5/8 to 16 5/8 to 16 3/4 to 15 3/4 to 15 3/4 to 15	x 3/8 to		.40	44
to 13/8	x ¼ to	5	.30	46
to 1 16	x 3% to	78	.20	44
1/8 to 13/8	x 38 to		$\overline{10}$	"
		1 5	20	44
1/2 to 4	x ¼ to	1.6	Base, no e	vtr
1/2 to 4	x 3/s to	112	.30	401
3% to 4	$\times 1^{\frac{1}{16}}$ to		.50	44
to 4	x 15/8 to			44
to 4	x 2 18 to			44
11/4 to 6	x 14 to			**
14 to 6	x 35 to	1	.10	66
11/4 to 6	$\times 1\frac{1}{16}$ to	11/3	.40	"
1 1/4 to 6	x 1 % to		.60	44
1 1/4 to 6	x 2 1/8 to	3	80	
61/4 to 63/4	x 1/4 to		.50	44
to 8	x 1/4 to		.70	44
31/4 to 8	x 3/8 to		.60	44
314 to 8	x 158 to	9/2	80	66
	x 218 to	9	1.00	
				66
8 14 to 10	x 1/4 to			66
8 ¼ to 10	x 3/8 to	1		66
8 4 to 10	$\times 1^{-1}_{-16}$ to	1 1 2		"
8 1/4 to 10	x 15/8 to	2	1.00	

Flats $\frac{7}{32}$ inch thick, 10 cents per lb. higher than $\frac{1}{4}$ to $\frac{5}{16}$ inch thick.



WEIGHTS OF ROUND AND SQUARE IRON

PER FOOT

Size in	Rounds	Squares	C:	Rounds	Squares
Inches	Weight Lbs.	Weight Lbs.	Sizes in Inches	Weight Lbs.	Weight Lbs.
11111111111111111111111111111111111111	.092 .164 .257 .368 .501 .654 .828 .1.023 1.237 1.473 1.728 2.000 2.618 2.955 3.313 3.692 4.090 4.510 5.410 5.890 6.392 6.913 7.455 8.018 8.60 9.20 9.83 10.47 11.82 11.82 11.82 11.82 11.82 11.82 11.82 11.83 11.84 11.84 11.86 11.	.118 .208 .325 .468 .638 .833 1.055 1.300 1.576 1.875 2.200 2.552 2.930 3.333 3.763 4.219 4.701 5.208 5.742 6.300 6.888 7.500 8.138 8.802 9.492 10.21 10.95 11.72 12.51 13.33 15.05 16.88 18.80 20.83 22.97 25.21 27.55	0.000 0.000	23.56 25.57 27.65 29.82 32.07 34.40 36.82 39.31 41.88 50.11 53.01 56.00 59.06 62.21 65.45 68.76 72.17 75.64 79.19 82.83 86.56 90.36 94.25 102.00 110.60 119.30 128.30 147.30 147.30 147.30 157.60 147.30 157.60 147.30 157.60 147.30 157.60 147.30 157.60 147.30 157.60 147.30 157.60 147.30 157.60 157.	30.00 32.55 35.20 37.96 40.83 43.80 46.88 50.05 53.33 56.20 67.50 71.30 75.20 79.21 83.33 87.55 91.88 96.30 100.02 105.50 110.20 115.10 120.00 140.80 151.90 163.30 20.20 213.3 226.9 240.8 255.2 270.0



WEIGHTS OF FLAT ROLLED IRON

PER LINEAL FOOT

Width in Inches	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness	Thickness
	1/8	3 16	1/4	5 16	3/8	7 1 6	1/2	5/8	34	7/8	1
1111122222333444455555678911112	.211 .27 .32 .37 .42 .47 .52 .58 .63 .74 .84 .95 .1.04 .1.16 .1.25 .1.35 .1.46 .1.67 .1.77 .1.88 .2.19 .2.29 .2.40 .2.40 .2.41 .4.47	.31 .40 .48 .56 .63 .71 .79 .87 .95 1.11 1.27 1.58 1.74 2.06 2.23 2.38 2.50 2.66 2.81 3.13 3.24 4.3.59 4.38 5.63 6.28 6.28 6.28 6.38 6.38 6.38 6.38 6.38 6.38 6.38 6.3	.422	.53 .66 .79 .92 1.05 1.17 1.30 1.44 1.57 1.82 2.08 2.36 2.36 2.61 2.88 3.13 3.38 3.65 5.21 5.73 5.99 6.25 7.29 8.34 10.42 11.46 11.46 11.46 11.47 11.4	.633 .799 .955 .1100 1.266 1.400 1.566 1.711 1.87 2.188 2.501 2.811 3.122 3.433 3.755 4.066 4.377 4.68 5.000 5.311 5.62 5.94 6.25 6.58 6.58 7.190 7.500 8.755 10.000 11.25 12.50 13.75 12.50 13.75 12.50 13.75 12.50 13.75 12.50 13.75 12.50 13.75 12.50 13.75 12.50 13.75 12.50 13.75 12.50 13.75 12.50 13.75 12.50 13.75 12.50 13.75 12.50 13.75 12.50 13.75 13.	.73 .92 1.11 1.29 1.48 1.64 1.82 2.00 2.19 2.55 2.92 3.28 4.00 4.38 4.74 5.10 6.56 6.93 7.29 7.66 8.02 8.39 8.71 11.67 13.13 14.59 16.59	1.05 1.27 1.48 1.69 1.87 2.08 2.29 2.50 2.91 3.33 3.75 4.16 4.58 5.00 5.41 5.83 6.25 6.66 7.50 7.92 8.75 9.58 10.00 11.67 13.33 15.00 16.67 18.33 20.00	1.57 1.85 2.11 2.34 2.60 2.86 3.12 3.64 4.16 4.68 5.20 5.72 6.25 6.77 7.29 9.36 9.90 10.41 10.94 11.45 11.98 12.50 14.58 16.67 18.75 20.83 22.90 25.00	2.20 2.50 2.81 3.12 3.43 3.75 5.00 5.62 6.25 6.87 7.50 8.12 8.75 10.00 11.25 11.88 12.05 11.88 15.00 20.00 25.00 25.00 27.50 30.00	2.91 3.28 3.64 4.01 4.37 5.10 5.83 6.56 7.29 8.02 8.75 9.47 10.20 10.93 11.66 12.40 13.12 13.85 14.58 15.31 16.04 16.77 17.50 20.42 23.33 26.25 29.17 32.08	3.754 4.164 4.588 6.666 7.5583 9.160 10.83 11.666 17.500 23.33 26.67 30.000 33.33 36.000 33.33 46.000



SWEDES IRON HOISTING ROPE

6 STRANDS, 19 WIRES PER STRAND

Diameter in Inches	List Price per Foot	Strength in	Proper Work ing Load in Tons of 2000 Lbs.	Approximate Weight per Foot	Diameter of Drum or Sheave in Ft Advised
1/4	.06½	1.1	.22	.10	1.50
35	$.06\frac{3}{4}$ $.07$	1.5	.30	.15	2
8/0	.07	2.4	.48	.22	2.25
70	.071/2	2.9	.58	.30	2.75
1/2	.081/2	3.9	.78	.39	3
(g)	.10	4.7	.94	. 50	2.75 3 3,5
5%	.12	4.7 6 8.5	1.20	. 62	4
3/4	. 16	8.5	1.70	. 89	4.5
1/4 176 3/8 11/2 1/8 1/8 5/8 3/4 7/8	.20	11.8	2.36	1.20	5.5
1	. 26	14.5	2.90	1.58	4.5 5.5 6 7
1 1/8	. 33	18.6	3.72	2	7
11/4	.40	22.8	4.56	2.45	7.5
1 3/8	.49	28	5.6	3	8.5
11/2	.49 .57	33	6.6	3.55	9
1 1/8 1 1/4 1 3/8 1 1/2 1 5/8 1 3/4 1 7/8	. 65	38	7.6	4.15	10
13/4	.80	44	8.8	4.85	11
1 7/8	.88	50	10	5.55	12
2	.95	55	11	6.30	12
21/4	1.17	72	14.4	8	14
$\frac{2\frac{1}{4}}{2\frac{1}{2}}$	1.40	92	18.4	9.85	15
234	1.70	111	22.2	11.95	17

6 STRANDS 37 WIRES PER STRAND

3/8	.12	4.2	.84	.22	1
7.6	$.12\frac{1}{2}$	5.5	1.1	.30	1.16
1/2	.13	7.25	1.45	. 39	1.33
9	.15	9.5	1.9	.50	1.5
5/0	.18	11.2	2.2	.62	1.75
3/4	.23	17.5	3.5	.89	1.83
7%	.28	23	5	1.20	2.16
1 /8	.37	29	6	1.58	2.5
1 1/6	.46	34	7	2	2.83
11/8	.55	45	9	$\frac{1}{2.45}$	3.2
1 3/2	.65	55	11	3	3 5
112	.79	63	12	3.55	3.75
1 5/0	.89	71	14	4.15	
13/	1.05	84	17	4.85	
2/4	1.35	105	21	6.30	
21/	1.60	125	25	8	
214	1.92	160	32	9.85	
232	2.30	200	40	11.95	

Ropes composed of strands made up of more than 37 wires add 10% to list price of 6x37.



TILLER ROPE

Diameter in	List Pr	ICE PER FOOT	Approximate
Inches	Iron	Cast Steel	Weight per Foo
14 - 5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$.07\frac{1}{2}$ $.08$ $.09$ $.10$ $.11\frac{1}{2}$ $.14$	$ \begin{array}{c} .11 \\ .12 \\ .14 \\ .15 \\ .17 \\ .20 \\ .24 \\ .30 \\ .36 \\ .43 \end{array} $.07 .11 .16 .21 .28 .35 .43 .62
34 7/8 1 1 1/8 1 1/4	$\begin{array}{c} .14 \\ .17 \\ .22 \\ .27 \\ .33 \\ .39 \\ .45 \end{array}$.30 .36 .43 .50	.62 .84 1.10 1.60 2.10

WIRE GALVANIZED STRAND

This strand is composed of seven steel wires twisted into a single strand. For Smoke Stack Guys, Electric Light Plants, Street Railways, Signal Cord, Fencing and Other Purposes.

Diameter	Seven Wires No.	Approx. Weight per 1000 Feet (Lbs.)	Approx. B. S. (Lbs.)	List per 100 Feet
3 3 2	21	20	400	0.80
1/8	20	32 55	500	1.00
7/8 5 3/2	18	55	900	1.15
3 16	17	75	1,400	1.25
$\frac{7}{32}$	16	95	1,800	1.50
$\frac{1}{4}$	14	125	2,300	1.75
16	12	210	3,800	2.25
$\frac{16}{3/8}$ $\frac{7}{16}$ $\frac{1}{2}$	11	295	5,000	3.50
7 16	9	415	6,500	4.50
1/2	8	510	8,500	5.50

Intermediate sizes take next higher list.

CRUCIBLE HOISTING ROPE CAST STEEL 8 STRANDS, 19 WIRES PER STRAND

Diameter in Inches	List Price per Foot	Approximate Strength in Tons of 2000 Lbs.	Proper Working Load in Tons of 2000 Lbs.	Approximate Weight per Foot	Diameter of Drum or Sheave in Ft. Advised
1/4 6 6 3/8 7 6 /2 1 1/2 1 6 /6	.10 .10 ¹ / ₄ .10 ¹ / ₂ .11 .12 .14 .16	1.80 2.75 4.2 5.7 7.3 8.7 10.9	.36 .55 .84 1.14 1.46 1.74 2.18	.09 .13 .20 .27 .35 .45	.75 .83 1 1.16 1.33 1.5 1.75
34 78 1 11/8 11/4 13/8 11/2	.21 .27 .34 .42 .51 .62	15.3 20 26 34 42 51 58	3.06 4 5.2 6.8 8.4 10.2 11.6	.80 1.08 1.42 1.80 2.20 2.70 3.19	1.83 2.16 2.5 2.83 3.2 3.5 3.75



THE CROSBY DROP FORGED WIRE ROPE CLIP



PLATE 7383

Price, in Cents	Diameter of Rope, in Inches	Circumference of Rope, in Inches
600	2 1/2	7 1/8
500	21/4	7 1/8
400	2	61/4
350	1 3/4	51/2
60	1 1/2	4 3/4
55	13/8	4 1/4
50	114	4
50	1 1/8	3 1/2
50	1	3
45	7/8	23/4
40	3/4	21/4
35 30	5/8	2
30	1/2	$1\frac{1}{2}$
25	3/8	1 1/8
25 25	-5 16	1
25	1/4	3/4

EXTRA HEAVY WIRE ROPE CLAMPS WITH THREE BOLTS



PLATE 7384

Price, Each	Diameter of Rope, in Inches	Circumference of Rope, in Inches			
16.50	234	85/8			
15.00	21/2	7 /8			
13.75	2 1/4	6 1 / 8			
8.50	2	$\frac{6\frac{1}{4}}{5}$ and $5\frac{1}{6}$			
5.50	1 5/8 and 1 3/4				
3.80	$1\frac{3}{8}$ and $1\frac{1}{2}$	4 1/4 and 4 3/4			
2.50	1 1/4	4			
1.90	1 1/8	3 1/2			
1.75	1	3			
1.30	7/8	2 3/4			
1.05	38	2 1/4			
.90	5% and 116	$2 \text{and } 2\frac{1}{8}$			
60	1/2 and 1/8	1 1/2 and 1 3/4			
.60 .45	3% and 76	1 1/8 and 1 1/4			
.30	1/4 and 1/6	34 and 1			

IRON AND STEEL WIRE CLOTH





PLATE 5361 4 MESH, NO. 14 WIRE PLATE 5362 8 MESH, NO. 18 WIRE

The mesh in wire cloth is the distance from center to center of wire. No length less than 100 feet shall be considered a roll.

CONDENS	ED PE	RIC	E L	IST	OF A	ALL	GRA	DES		
No. Meshes per inch. 1 (No. of Wire			.73	5.60	6 . 50	7 .44	8 .38	9.32	10 .28	12 .20
34 No. of Wire		05	.88	$\frac{5}{.73}$	6.60	. 50	8 .42	.38	10 .32	12 .22
5/8 No. of Wire Price, sq. ft		20	$\begin{smallmatrix}4\\1.05\end{smallmatrix}$. 88	6 .73	. 60	. 50	9.40	10 .35	12 .25
2 {No. of Wire			$\begin{smallmatrix}4\\1.35\end{smallmatrix}$	$\overset{5}{\overset{1.10}{}}$. 88	.75	. 60	. 50	10 .42	12 .30
2½ No. of Wire		:			$\frac{6}{1.30}$.7 .90	. 72	. 60	10 . 50	12 .35
3 {No. of Wire		3.00	.75	. 60	. 11 . 50	$^{12}_{.40}$.35	.30	15 .25	.20
3½ No. of Wire		::		.75	. 65	$^{12}_{.50}$	13 .40	14 .35	.30	.25
4 {No. of Wire		15	16 .27	$^{17}_{.22}$.18 .17	.19 .14	.12	.11	.10	
4½ No. of Wire		11 00	.73	$^{13}_{.55}$.42	15 .35	.30	.25	.20	
5 No. of Wire			. 12 . 80	. 60	.48	15 .40	.35	.30	.25	
6 No. of Wire				. 13 . 80	. 14 . 60	.15 .48	.40	.35	.30	
7 No. of Wire		16 18	. 17 . 40	$^{18}_{,35}$	19 .30	20 .25	.21	.17	23 .14	
8 No. of Wire			17 .48	18 .42	.35	.30	.21 .25	22 .22	.23 .17	
9 {No. of Wire			17 .60	18 .48	19 .42	20 .35	.32	.22	.23	
10 No. of Wire				. 18 . 60	19 .48	20 .40	21	22	23 .25	



SOLID HANDLE, FLAT WAY STOP COCKS





				The same of the sa		
PLATE 5476 BRASS TEE HANDL	Ε	PLA	TE 5477	BRASS L	EVER HAN	DLE
SizeInches	1/4	3/8	1/2	5/8	3/4	1
Rough. per doz. Finished per doz. Nickel Plated per doz.	16.20 20.40 24.60	17.40 21.60 25.80	18.60 22.80 27.00	25.80 30.60 35.40	30.60 36.60 42.60	42.00 51.00 60.00
SizeInches	1 1/4	1 1/2	2	2 ½	3	(2)
Rough per doz. Finished per doz. Nickel Plated per doz.	70.20 82.20 94.20	105.00 123.00 141.00	186.00 210.00 234.00	288.00	402.00	

Solid Handle, Flat Way Stop and Waste Cocks

FOR IRON PIPE





PLATE 5478 BRASS TEE HANDL	Ε		PLATE !	5479 BR	ASS LEVER	HANDLE
SizeInches	1/4	3/8	1/2	5/8	3/4	1
Rough. per doz. Finished per doz. Nickel Plated per doz.	$\begin{array}{c} 16.80 \\ 21.00 \\ 25.20 \end{array}$	18.00 22.20 26.40	19.20 23.40 27.60	26.40 31.20 36.00	31.20 37.20 43.20	43.20 52.20 61.20
SizeInches	1 1/4	1 1/2	2	2 1/2	3	
Rough per doz. Finished per doz. Nickel Plated per doz.	72.00 84.00 96.00	108.00 126.00 144.00	192.00 216.00 240.00	300.00	420.00	



STANDARD COMPRESSION HOSE BIBBS

FOR IRON PIPE



PLATE 5480 HOSE BIBB WITH PLAIN TOP

SizeInches	1/2	5/8	3/4	1
Rough per dez.	16.20	21.60	27.60	51.00
Finished per dez.	16.80	22.80	28.80	54.00
Nickel Plated per doz.	19.80	25.80	32.40	58.80

STANDARD COMPRESSION PLAIN BIBBS

FOR IRON PIPE



PLATE 5481
PLAIN BIBB WITH PLAIN TOP

Size Inches	3/8	1/2	5/8	3/4	1
Rough per doz. Finished per doz. Nickel Plated per doz.	13.80	13.80 14.40 17.40	19.20 20.40 23.40	26.40	$45.00 \\ 48.00 \\ 52.80$

USEFUL INFORMATION

AND

ENGINEERING DATA

HORSE POWER OF SHAFTING

Попер				Nun	Number of	1	Revolutions	s Per	Minute	9					
Power.	25	30	35	40			0.2	80	100	125	150	175	200	250	300
-	13%	roj.	11%	11%	13	178	1	10/10	1/8	60/5	3%	3%	11	8/2	1/2
٦ ،	113	111	#6 F	11/2	1	10 F	11/4	13	11/8	$1\frac{1}{16}$	1	191	8/2	100	3/4
1 c	916	9 FC	176	13/	15%	11/2	17	1%	1 5	$1\frac{3}{16}$	1 18	11/8	1 16	_	
o ~	91/	9.1%	0 1 67	1,0	173	15%	1 2 2	$1\frac{1}{2}$	17	1 5	11/4	$1\frac{3}{16}$	$1\frac{3}{16}$	1%	116
# L	10	91/8	S .	21%		1	134	15%	11/2	1 %	1 5	1%	$1\frac{1}{4}$	$1\frac{3}{16}$	1 1/8
9 0	1 c	40	917	000	676	17%	133	13/4	15%	$1\frac{1}{2}$	13%	$1_{\frac{5}{16}}$	11/4	$1\frac{3}{16}$	$1\frac{3}{16}$
0 1	1 c	0 1 6 9 9	45	9.17	2,1%	2 2	- H	17/2	1	19	11/2	1%	$1\frac{5}{16}$	11/4	1 18
- 0	516	1 c	9 1 6	10	9.1/	9,1%	2	1120	1	15%	15%	$1\frac{1}{2}$	$1\frac{7}{16}$	1 15	$1\frac{1}{4}$
x 0 c	00 m	8 %	1 C	917	10	0 00	16	2	1 1/2	13%	15%	11/2	11/2	13%	$1\frac{5}{16}$
J (1	2 18 1	4% c	8%6	27.50	0 16	917	916	9.1	1 1 1 0 1 0 1	113	144	1 8	11/2	17	1 5
10	316	2 C	4%	4 c	017	10	100	917	97.6	1	110	15%	11%	17	1%
	3,48	218	1-10	8/6	4 c	9 1 6	1 c	1 c	16	17/2	11	177	15%	11%	17
12	3 1 G	3.1%	8/, 7	77	1 0	000	0 1 6	0 1 6 1 7 6	017	1 / H	17%	177	15%	6	17
13	31/4	3 3 3 3 3 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5	00	8/,8	8% 7	2 16	200	44	8/7	917	2/2	1 1 1 1 2 2	111	90	11%
14	69	90 100	31/8	215	216	278	276	27.6	8,7	7 0	2 × ×	1 1	1 16	1 1 6	7 -
75	31%	3%	31%	2 15	23%	25%	$\frac{2}{16}$	2 %	$2\frac{1}{16}$	216	1 1 1 1	 - - - -	1%	8 × 1	т т
16	60	33%	3 13	31/8	213	2%	2 1 2	2 3/8	21/4	21/8	118	1,8	- - -	1 1/8	-ı p
17	30.5	C. C.	ಲ ಪ್ರ	3	2 7/8	211	2 19	$2\frac{7}{16}$	$2\frac{5}{16}$	21/8	27	1,8	145	116	н,
0	017	31%	60	က	215	23%	25%	2 18	$2\frac{5}{16}$	21/8	$2\frac{1}{16}$	118	1/8	T%	٠,
06	0 10	32%	33%	31/	31	213	211	25%	2 1 6	21/4	21/8	23	118	1 100	٦.
1 c	116	9 13	200	31%	es.	31%	215	27/8	25%	272	2 5	$2\frac{1}{8}$	21/8	116	_
3 6	# *	118	0 0	23/2	216	31/	31%	33	27/8	2 3	27	200	2 3	2 13	-
300	4 1 9	4 4	016	215	3 2/2	3 2	0 00	3 3	2120	2 11	2 3	27	2 5	21/8	23
00	412	4 16	8/. #	910	8/0	0.16	10	0.7				1			

HORSE POWER OF SHAFTING—Continued

Horse				Nun	Number of		Revolutions	s Per	Minut	9					
Power.	25	30	35	40	20	09	0.2	80	100	125	150	175	200	250	300
40	21/8	4 - 9	41/4	41/8	37/8	31/2	37	35 TE	3 3 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1	2 15	243	2 3	27	21%	21%
45	50	47/8	41%	41/4	63 14 15 15 15 15 15 15 15 15 15 15 15 15 15	33%	3 2%	50	C. C.	915	9.3%	9.5%	917	93/	0 6
50	51%	44.5	45%	4.7	47	313	3 11	217	2 50	21/2	470	5118	1 6	10	0 1 6
o re	73%	517	72.4	116	416	918	9 13	0 /2	93/	800	0 16	016	8/18	010	4,00
	2 1	8/2	1,8	1,8	4/4	4	0	016	8/ 0	016	9	8,7	216	2/2	8%7
0.9	8% 9	₹/ ₁ G	418	4 3/4	43%	41/8	3 18 18	33%	31/2	31/4	31%	27/8	23%	2 3	27
20	534	$5^{1/2}$	$5^{1/4}$	10	4 3	4 3/8	41/4	3 15	35%	37	31%	31%	27/2	911	666
80	6 16	534	51/2	514	415	41/2	43%	4-75	513	6	60	31/	31%	9.1%	31
06	61/4	9	5 5%	5-7	51%	4 3/4	41%	41%	4 4	33%	31%	, cc	0 60	010	937
100	6 13	614	5 3%	5 %	5%	41,4	4 5%	47.4 1.2	41/	3 1/2	377	33%	31%	316	4/20
120	6 100	6 3/4	61/4	9	75	51%	2	47%	47.	41%	0 0 0	3 2%	217	21/3	21/3
140	71%	64.5	63%	63%	100	51%	73%	0	45%	41/0	916	913	9 11	4/0	9/8
160	75%	717	6 15 T	63%	616	4 %	0 10	7	115	47	11/	18	9 1 6	0 0 0	400
000	0/0	4, 1	016	4/10	8/8	47	016	4/4	116	116	1.4	#	016	516	016
TOD	0	1/2	8/1	8/,0	P 74	51 c	5%	9,I.C	8/19	4 3/4	4 1/2	41/4	4	334	$\frac{31}{2}$
200	$8^{1/4}$	7 18	7 3/8	7 16	611	6 1/8	57/8	534	5%	415	45%	41%	41/4	37/2	35%
250	6	8 1/2	00	71/2	71/8	611	63%	6-1	53%	514	10	45%	4-7-	41%	20 130
300	91%	6	8 2%	81/4	71/9	7 1	67%	0 10	9	51%	51%	10	43%	4.7	416
350	10	9 3%	6	81%	715	7.3	7-7	61%	6.7	2%	1	10	i rc	45%	43%
400	101%	97/8	9-7-6	6	83%	71%	73%	71%	63%	61%	23%	25	517	17/2	11/8
450	1034	101%	913	91%	83%	0 00	2 3	73%	9 104	61%	# 50	2 7 2	73/4	4 TC	H -
200	$11\frac{5}{8}$	101%	10	9 2%	6.	83%	· 00	71%	71%	63%	69	4%	o re	7 c 16	478 477
550	$11\frac{1}{2}$	1078	10 3%	10	91%	87,0	81%	· 00	75%	63%	61%	4	2 20	2 %	H 10
009	117/8	$11\frac{3}{4}$	105%	101/4	91/2	81.00	8 1/2	81/8	7 3/4	71/8	634	614	100 T	o ro	51%



RULE FOR FINDING LENGTH OF BELTS

All formulas for figuring length of belt are usually inaccurate. Steel tape measurements should be used wherever possible.

BELTING

The diameter of the pulleys should be as large as can be admitted.

The pulleys should be a little wider than the belt required for the work.

Belts should be kept soft and pliable. For this purpose blood warm tallow, dried in by the heat of fire or the sun, is advised. Castor-oil dressing is also good.

If possible to avoid it, connected shafts should never be placed one directly over the other, as in such case the belt must be kept very tight to do the work.

For this purpose belts should be carefully selected of well stretched leather.

In Europe cog-wheels are used to transmit power almost exclusively, but in America 99 per cent. of the power transmitted is by belting. Cog-wheel transmission is positive, belting is not, because with every revolution of a pulley a portion of the power is lost; the loss varies with the condition of the belt, change of load, state of the atmosphere, etc. The power of a belt to transmit motion is derived from the friction hold on the pulley: this is governed by the pressure or tension; a safe maximum working tension is about 45 lbs. per inch in width. No dogmatic rule can be laid down to determine the efficiency of a belt. After a series of numerous experiments, Joshua Rose (Modern Machine Shop Practice) states that belts vary from 25 to 100 per cent. in efficiency, for reasons given above. A long belt will transmit more power than a short one of same width and tension. Consequently long belts are always the best if it is possible to use them. A 1 inch belt traveling 800 feet per minute and with power tension will transmit 1 horse-power. If the same belt travels 1,600 feet the power will be doubled. Each additional inch to the width will add 1 horse-power, at the same speed and tension. A belt under good conditions will deliver 97 per cent. of its efficiency. If belts are too tight there will be quite a loss from friction of the journals, etc.; if too loose there will be still more loss by slipping. Excessive slipping also dries out the leather and reduces the adhesion. Within reasonable limits the greater the speed the more efficient a belt will be. About 3,750 feet per minute seems to be the maximum. A double belt will last longer than a single one, and will take double the tension, and will transmit 7/10 more power, as capacity to transmit power is governed by the frictional width of belt and its pulling strength. A raw-hide belt will transmit from 25 to 50 per cent. more power than a tanned one, and

for straight, non-shifting work is much the most economical, but it is not adapted to cone pulleys or counter shaft work. Belts should be used with the hair side to the pulley. If pulleys are covered with leather there will be a gain of 25 per cent. in wear of belt and in power transmitted.

It is best to have the belts run off from the main shaft in opposite directions to equalize the strain on the bearings. Let the diameter of the pulleys be as large as possible, within the maximum belt speed (3,750 feet per minute), and a belt should never be overworked, and the tension such as will give a slight sag when in motion. The per cent. of power lost by shaft journal friction should not exceed 20 per cent. of the full load; if it does it may be charged to tight belting. The breaking strength of good leather belting per inch in width is the solid leather, 675 lbs.; at rivet holes, 362 lbs.; at lacing holes, 200 lbs. It will be seen therefore, that belts would be far more durable if lacing could be done away with, as is being done in some establishments, the ends of belts being lapped and cemented, thus making the joints as strong as the body of belt.

To Find the Length of Belt Wanted—Rule 1. Add the diameter of both pulleys together, divide by 2, and multiply quotient by 3¼; add this product to twice the distance in inches between the center of shafts, and the final sum will be the length required.

Example.—Diameter of large pulley 24 in. +12 diameter of small pulley $=36\div2=18\times3^4/4=58^4/2+216$ twice distance between shafts $=274^4/2$ inches, length required.

To Find Width of Belt required for a given horse-power. Rule 2. —Multiply the horse-power by the constant 2,750, then multiply the diameter of driven pulley by the number of revolutions and divide the first product by the latter, the quotient will be the width of belt required. Example 2. Horse-power $28 \times \text{constant } 2,750 = 77,000$; diameter of pulley 36 in. \times revolution 200 = 7,200; $77,000 \div 7,200 = 10$ inches, width required.

To Find the Horse-Power which a belt will transmit. Rule 3.— Multiply the width of belt by diameter of driven pulley in inches, multiply this product by revolutions of pulley per minute, then divide final product by constant 2,750, the quotient will be the horse-power. Example 3. Belt 10 in. \times 36 diameter of pulley = 360 \times 200 revolutions = 72,000 \div 2.750 constant = 26.5 horse-power required.

The Horse-Power and Width of belt given, find the diameter of driven pulley required. Rule 4.—Multiply the horse-power by constant 2,750, now multiply revolutions of pulley by the width of belt, then divide the first product by the latter, the quotient will be the diameter wanted. Example 4. Horse-power $28 \times 2,750 = 77,000$; revolutions $200 \times 10 = 2,000$; $77,000 \div 2,000 = 38.5$, diameter wanted.

The Horse-Power, Diameter of Pulley and Width of Belt Given, find the number of revolutions of driven pulley. Rule 5.—Multiply the horse-power by 2,750, now multiply the diameter of pulley by the width of belt, and then divide the first product by the latter. Exam-



ple 5. Horse-power $28 \times 2.750 = 77,000$; diameter 36×10 width = 360; $77,000 \div 360 = 211.4$ revolutions wanted.

The above rules assume that the driving and driven pulleys are of equal diameter, and the contact of belt half the circumference. If pulleys are of different diameter and contact of belt is less than half of circumference, then the rules must be modified as per tables below of areas of contact.

TABLE OF BELT CONTACTS

$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Ratio. 2.21 1.72 1.6 1.4 1.24 1.17	Constant— Single Belt. 6080 4730 4400 3850 3410 3220 2750	Double Belt. 4250 3310 3080 2700 2390 2250 1925

For all practical purposes, the arc of contact of belt on smaller pulley can be roughly estimated by comparison with figures in first column in table above. For example, take arc of contact 150° and compare it with your belt. If it agrees approximately, then taking Rule 3 we have Example 3 modified as follows: Belt $10 \times 36 = 360 \times 200 = 72,000 \div$ by new constant 3,410 = 21.1 horse-power, or a loss of 5.4 horse-power as compared with full contact or half circumference in Example 3.

Other Rules for finding speed and size of pulleys. To find size of driving pulley, multiply the diameter of driven by revolutions it should make, and divide the product by revolutions of driver. Example 1. Diameter of driven, 12 inches; revolutions 240; revolutions of driver, 160; then $12 \times 240 = 2880 \div 160 = 18$, diameter of driver wanted.

To Find the Size of Driven Pulley, multiply diameter of driver by its revolutions, and divide the product by revolutions of driven. Example 2. Diameter of driver, 18; revolutions, 160; revolutions of driven, 240; then, $18 \times 160 = 2880 \div 240 = 12$, revolutions of driven wanted.

To Find the Number of Revolutions of Driven, multiply diameter of driver by its revolutions, and divide product by diameter of driven. Example. Diameter of driver, 18; revolutions, 160; diameter of driven, 12 inches; then, $18 \times 160 = 2880 \div 12 = 240$, revolutions of driven wanted.

To Find the Horse-Power of a Driving Pulley, multiply the circumference of pulley by the revolutions, and this product by width of belt, and divide final product by 600. Example. Circumference of pulley, 56.55; revolutions, 160; width of belt, 6 inches; then $56.55 \times 160 = 9048 \times 6 = 54,288 \div 600 = 9.04$, horse-power of pulley wanted.

TO FIND LENGTH OF BELT WHEN CLOSELY ROLLED

Add the diameter of the roll in inches to the diameter of the eye, multiply this by the number of turns. This result multiplied by the decimal, .1309 will give the length of the roll in feet.

SHEET METALAND SUPPLY CO.

Table of horse-power transmitted by single leather belts, also four-ply rubber and four-ply and driven belts, to pulley being equal.

HORSE-POWER OF LEATHER BELTING

The horse-power of double leather, six-ply rubber or six-ply cotton belting is as 10 to 7 of that given in table.

OF.	10		f:										el en												
	30	1		٠													:					96	1		
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	24			:	:	:	:	:	:	:	:		•	:	:	:	:	:	:	:	:	21	:	:	
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	20				:	:	:	:	:	:	:		:	:	:	:	:	:		÷	:	17	:	•	
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ELT,	12	POW		:	:	:	: :	:	:	:	:	:	:	:		:	:	:	:	:		10.5	10.9	11.8	>
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70	In,																								
Diam.	Pulley,	c	0	2	8	6	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	

HORSE-POWER OF LEATHER BELTING-Continued

Diam of					M	WIDTH	OF	BELT,	INCHES	ES							1
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r diley, riv						H	ORSE	POW.	ER-								,
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50 60			. 4 1 4	4	9.9	8.7	10.9	13.1	15.3	17.4	19	22	24 2	97	28	ص ح	c o
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15		:	100	0 00	7	9.3	11.6	14.	16.3	18.6	:	:					
220	:	:	- 0	9	7.9	9.6	12.	14.4	16.8	19.2	:	:	:	ě			•
20 00	:	:	00	6.9	7.4	6.6	12.4	14.8	17.3	19.8	:	:		:			
34	:	:		. 4	7 6	10.2	12.7	15.3	17.9	20.4	:	:					
35		•		H 14	0 00	10	13.1	15.7	18.3	20.9	24	26	29	31	34	<u>-</u>	6
36		:	3 r	0.0	. 0	300	130	16.9	18.9	21.5			:	:			
37	:	:	0 I		4.0	11.0	70.0	16.6	10 3	1 66	25	28	30	32	36	39 4	-
38	:		5.5	6.0	0 0	17.	10.0	10.0	0.01	1 0	1)					
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			× ×	7.3	8	11.6	14.6	17.5	20.4	. so . so	56	29		25		1	4
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54			2.8	8.0	11.8	15.6	19.6	25.0	4.07	51.2	00	60					2 6
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	THE REAL PROPERTY.		-														

SHEET METAL SUPPLY CO. SUM CASTER. PENNA

The following table gives the approximate horse-power transmitted by the different chains at 100 to 1,000 feet per minute, under average conditions. The estimates are conservatively made. Where resistance is uniform, and other conditions are favorable, it would be quite safe to figure on higher results. If, however, the chain be subjected to shocks, or there are other unfavorable conditions, proper allowance must be made.

HORSE-POWER OF DETACHABLE LINK BELTING

,				SP	BED, FEET	PER	MINITE -			
B	100	900	300	001	001	000				
	000	,	000	400	000	009	200	800	006	100
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	4	0	9	. T	0.4	F. 3		2.5	2.75	cc.
	H .	0.	1.2	1.6	. 7	53		0 6	9 9	
	.45	6.	1.35	2 ×	6 6	0 6		3 0	7.0	3.5
	45	0	100		1 0	0.1		3.4	3.7	4
		. ,	T . 99	1.8	77.77	5.6		3.4	3 7	
	0.	Ţ.	1.5	2	7.0	0 6				
	10.	1 1	100	6 6	9 6	3 0		9.6	4.1	4.5
) L	1	T.00	7.7	7.7	3.5		4	4 4	0
	е.	Ι.	1.5	2	5	0 6		1 0		4.0
	ox.	1 6	6	0 6				9.0	4.1	4
	1 0		7	2.6	3.9	4.6		× ×	6 1	1
	97.	1.5	2.25	00	3 75	4 4		0 1	1.0	. ,
	1.	2	G.	_				0.0	.0	6.5
	-				4.1	5.4		8.9	7.4	0
		. 7	3.	4.	7.4	5.4		0 0		
	1.2	2.4	3 6	4 8		1 1		0.0	4.7	000
	2	3 6	0 0	0.4	0.0	1.0		∞ ∞	6.0	0
		0.0	6.0	2.6	6.3	7.3		0		
	1.4	2.8	4.2	25	2	1			0.6	10.5
	rc	8	1		- 0	, ,		9.6	10.5	11 4
	1		4.0	0	7.25			20	11 95	1 0 1
	0).1	3.5	5.25	7	OX.	0 75		0	07.11	17.
	6	4	2			01.0		12.	13.	14
	TO CO				9.75	11.25		14.	70	18
	0.0	-	10.	12.5	15.	17.		300	. 00	.01
	1.	· ∞	12.	LC	17	10			. 77	23.
	10	6	10			10.		23.	25.	27
			6.01	Τ(.	.02	. 77		96	06	

1½ inch pitch gears with Nos. 71 to 88 inch pitch gears with Nos. 103 to 160 When using gear wheels in connection with Link Belting and Sprocket wheels use % inch pitch gears with Nos. 25 to 34 inch pitch gears with Nos. 35 to 67



SPEED OF DRILLS

For Stationary Drill Presses

The following table shows the revolutions per minute for Drills from $\frac{1}{16}$ inch to 2 inches diameter, as usually applied. Oil drills can usually be run 25 per cent. faster.

Diam. of Drills,	Speed for Wrought Iron	Speed for Cast Iron.	Speed for Brass.
In.	and Steel.		3544
10 1/2 3 0 1/4 5 0 3/8 7 0 1/2 9 1/5 8 1/2 3/4 5/6 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1712	2383	3544 1772
1/8	855	1191	
3.	571	794	1181
1/4	397	565	855
5	318	452	684
3/2	265	377	570
1	227	323	489
16	183	267	412
9	163	238	367
16	147	214	330
78 11	133	194	300
16	112	168	265
13	103	155	244
東京	96	144	227
/8 1.5	89	134	212
16	76	115	191
1	72	108	180
$1\frac{1}{16}$	68	102	170
1 1/8	64	97	161
1_{16}	50	89	150
11/4	58	84	143
$1\frac{5}{16}$	55	81	136
1 1/8	53	77	130
$1_{\overline{16}}$	50	74	122
11/2	46	71	117
$1\frac{9}{16}$	44	66	113
1 %	40	63	109
1116	38	61	105
1% 1.1% 1.1% 1.1% 1.1% 1.1% 1.1% 1.1% 1	37		101
$1\frac{13}{16}$	36	59	98
1 1/8	33	55	95
115	32	53	92
2	31	51	94

These speeds should seldom be exceeded. Feed per revolution for $\frac{1}{4}$ inch Drill, .005 inch; for $\frac{1}{2}$ inch Drill, .007 inch; for $\frac{3}{4}$ inch Drill, .010 inch.

For Portable drilling judgment must be used as to speed.



TABLE OF GRINDING WHEEL SPEEDS

For Stationary Grinding Heads

Diam.			
Wheel,	Revolutions pe	er Minute for Surf	ace Speed of
In.	4000 Ft.	5000 Ft.	6000 Ft.
1	15279	19099	22918
2	7639	9549	11459
3	5093	6366	7639
4	3820	4775	5730
5	3056	3820	4584
6	2546	3183	3820
7	2183	2728	3274
8	1910	2387	2865
10	1528	1910	2292
12	1273	1592	1910
14	1091	1364	1637
16	955	1194	1432
18	849	1061	1273
20	764	955	1146
22	694	868	1042
24	637	796	955
30	509	637	764
36	424	531	637

The medium of 5,000 feet is usually employed in ordinary work, but in special cases it is sometimes desirable to run them at a lower or higher rate, according to requirements.

All regular wheels (6 in. diameter and upward) are tested immediately before shipment at not less than 9,000 feet per minute, giving them a stress of 250 lbs. or more per square inch, thus proving beyond any question that each and every wheel so tested is entirely free from defects or weakness before it is sent out; nevertheless it is recommended that they be run in actual use as moderately as practicable, so that an ample margin of safety may be allowed.

For Portable grinding judgment must be used as to speed.



NOTES ON PULLEYS

To Determine Sizes and Speeds of Pulleys

1st—To find what diameter of driving pulley should be to give driven pulley a certain speed, multiply the diameter of driven pulley by the number of revolutions it should make per minute, and divide this product by the number of revolutions per minute the driving pulley makes.

2nd—To find diameter of driven pulley, multiply diameter of driving pulley by the number of revolutions it makes per minute, and divide this product by number of revolutions per minute driven pulley should make.

3rd—To calculate speed of driving pulley, multiply diameter of driven pulley by number of revolutions per minute it makes, and divide this product by diameter of driving pulley.

4th—To calculate speed of driven pulley, multiply diameter of driving pulley by number of revolutions it makes per minute, and divide this product by diameter of driven pulley.

The same rules can be applied to gearing by substituting for the diameters of pulleys, either the number of teeth of the gears or the diameters in inches.

The above rules are practically correct, although owing to the slip, elasticity and thickness of the belt, the circumference of the driven seldom runs as fast as the driver.

Examples

A 30 inch pulley making 180 revolutions per minute, drives a countershaft with a 12 inch pulley. What is the speed of the latter? $180 \times 30 \div 12 = 450$ revolutions per minute.

A countershaft is to make 450 revolutions per minute, driven by a 30 inch pulley making 180 revolutions per minute. What will be the diameter of countershaft pulley?

 $180 \times 30 \div 450 = 12$ inches.

What will be the diameter of a pulley making 180 revolutions per minute, to drive a 12 inch pulley 450 per minute? $450 \times 12 \div 180 = 30$ inch pulley.

To Determine the Horse-Power of Pulleys

Multiply the circumference of the pulley in feet by the number of revolutions it makes per minute, and this product by the width of the belt in inches. Divide this result by 600, which will give the horse-power the pulley will safely transmit.

Table Showing the Greatest Distance Advisable between the Bearings of Line Shafts

Diam. of Shaft		$\overset{2}{15.89}$	$\begin{matrix}&&3\\18.19\end{matrix}$	$\begin{smallmatrix}4\\20.02\end{smallmatrix}$	$5\\21.57$
Diam. of Shaft Dist. bet. Bearings, Steel Shaft.	in.	$\frac{6}{22.92}$	$\frac{7}{24.13}$	$\frac{8}{25.23}$	$\frac{9}{26.24}$



NOTES ON FIRE PROTECTION IN FACTORIES

Fire pumps should be equipped with a relief valve and pressure gauge. It is well to have large capacity. For a five-story mill an allowance should be made of 250 gallons per minute for 1½ inch nozzle.

Water mains about the mill and yard should be of ample capacity, to reduce excessive friction losses. The diameter should be based upon a maximum velocity of 10 feet per second. Wherever the mains are subject to severe weather they should be fully protected.

Hydrants and valves should all be right-hand, and in any case the direction to open should be plainly marked. Care should be taken to drain all hydrants before severe weather.

All connections should be made uniform with those of the local fire department. Sizes 2 inch and under should be standard iron pipe thread.

For outside use, on hose reels and for all hose to be used in yard, medium weight rubber-lined cotton hose is best; fabric to be capable of standing a bursting pressure of 400 pounds when new, to have 2½ inch water-way, the lining to be smooth,

For inside use in mills, etc., a good quality rubber lined cotton mill hose is most satisfactory. Unlined linen hose is less expensive but has the greatest frictional resistance or pressure loss, it being from 10 to 50 per cent., increasing with the pressure.

Nozzles should be long, smooth pipes, and when 2½ inch or larger hose is used, swivel handles should be employed. The "Standard Underwriters' Nozzle" is 30 inches long, with swivel handles, and for ordinary use has 1½ inch outlet. Short nozzles without handles should not be tolerated for fire purposes; bad accidents often occur by their pulling away from the hosemen. It is essential that nozzles be finished smooth on the inside. A rough or battered nozzle on the inside cannot throw an effective stream,

Use double lines of hose and a Siamese nozzle for a long distance and a hot fire. A double line a thousand feet long delivers a 1¼ inch stream with the same force as a single line 287 feet long. Small streams are all right for small fires, but for large, hot fires use a 1¼ inch or a 1¾ inch stream. Such a stream will always make a black mark wherever it hits, and the stream, which hits and cools the burning coals is the "effective fire stream." Small streams are converted into steam before touching the coals.

Two hundred and fifty gallons per minute is a good standard fire stream with 80 pounds pressure at the hydrant. One hundred pounds pressure should not be exceeded, except for very high buildings or length of hose exceeding 300 feet.

Keep your fire apparatus in readiness for instant use and let your employees be familiar with every part of it by having frequent inspection and drills.



TABLE OF EFFECTIVE FIRE STREAMS

Using 100 Feet of 2½ Inch Ordinary Best Quality Rubber-Lined Hose Between Nozzle and Hydrant, or Pump

		-			
					_
32	43	54			86
30	40	50	60	70	80
2	3	4	5		6
48	60	67	72		79
37	44	50	54		62
90	104	116	127	137	147
		-% In			
34	46	57			91
30	40	50	60	70	80
4	6		Y21-15-15-15		11
49	62				85
42	49				70
123	142	159	174	188	201
		–1 In	ch.—		
37	50	62	75	87	100
30	40	50	60	70	80
7	10				20
51	64				88
47	55				76
161	186	208	228	246	263
40					
42	56				112
30	40	50	60	70	80
	-			1	32
52	65	75	83	88	9:
					0 -
50 206	$\begin{array}{c} 59 \\ 238 \end{array}$	$\frac{66}{266}$	$\begin{array}{c} 72 \\ 291 \end{array}$	$\begin{array}{c} 77 \\ 314 \end{array}$	81 336
	30 2 48 37 90 34 30 4 49 49 123 7 7 51 47 161 42 30 12	32 43 30 40 2 3 48 60 37 44 90 104 34 46 30 40 4 66 49 62 42 49 123 142 37 50 30 40 7 10 51 64 47 55 161 186 42 56 30 40 12 16	32 43 54 30 40 50 2 3 4 48 60 67 37 44 50 90 104 116	30 40 50 60 2 3 4 5 48 60 67 72 37 44 50 54 90 104 116 127	32 43 54 65 75 30 40 50 60 70 2 3 4 5 5 48 60 67 72 76 37 44 50 54 58 90 104 116 127 137



ELECTRICAL UNITS

The electric units are as follows:

Volt—The unit of electrical motive force. Force required to send one ampere of current through one ohm of resistance.

Ohm—Unit of resistance. The resistance offered to the passage of one ampere, when impelled by one volt.

Ampere—Unit of current. The current which one volt can send through a resistance of one ohm.

Coulomb—Unit of quantity. Quantity of current which, impelled by one volt, would pass through one ohm in one second.

Farad—Unit of capacity. A conductor or condenser which will hold one coulomb under the pressure of one volt.

Joule-Unit of work. The work done by one watt in one second.

Watt—The unit of electrical energy, and is the product of the ampere and volt. That is, one ampere of current flowing under a pressure of one volt gives one watt of energy.

One electrical horse-power is equal to 746 watts.

One kilowatt is equal to 1,000 watts.

To find the watts consumed in a given electrical circuit, such as a lamp, multiply the volts by the amperes.

To find the volts, divide the watts by the amperes.

To find the amperes, divide the watts by the volts.

To find the electrical horse-power required by a lamp, divide the watts of the lamp by 746.

To find the number of lamps that can be supplied by one electrical horse-power of energy, divide 746 by the watts of the lamp.

To find the electrical horse-power necessary, multiply the watts per lamp by the number of lamps and divide by 746.

To find the mechanical horse-power necessary to generate the required electrical horse-power, divide the latter by the efficiency of the generator.

To find the amperes of a given circuit, of which the volts and ohms resistance are known, divide the volts by the ohms.

To find the volts, when the amperes and watts are known, multiply the amperes by the ohms.

To find the resistance in ohms, when the volts and amperes are known, divide the volts by the amperes.

FOR EVERY DAY USE IN ENGINE ROOM

To find diameter of cylinder for a given power:

Multiply horse-power of engine by 33,000; divide product by the product of cylinder \times steam pressure \times piston speed in feet per minute.

 Rule for finding contents in cubic feet of a cylinder of any given diameter:

Multiply the square of diameter in inches by .7854 and this



product by length of stroke in inches. Divide last product by 1,728, and the result is contents of cylinder in cubic feet.

The diameter of the valve rod should be 1-10 to 1-12 of the cylinder diameter; or from 1-350 to 1-200 of unbalanced area of slide valve. This last is considering the valve as a piston. Steel rods, of course, will bear being made smaller.

Don't depend too much upon the glass gauge but try the cocks often enough to keep your hand in in telling the height of water by them. If a gauge cock has a tendency to leak, fix it thoroughly; if you do not you will neglect to use it for fear of the work which you may have to stop the leak after using.

Safety valves should be allowed to blow straight out into the room and not hitched on to a leading pipe which may allow water to stand on the valve, increasing its weight, or to freeze up if the boiler is laid up.

When the valve blows into the room it will be known, when steam is escaping, whether from leakage or over pressure.

The economy of an engine should always be rated by the amount of steam or water which it consumes per horse-power per hour. The amount of coal burned per horse-power per hour involves the economy of the whole plant, and is not a measure of the performance of the engine taken independently.

Horizontal engines, when practicable, should be run over rather than under, as the thrust will then come downward upon the foundation rather than upon the caps of the boxes and the upper guides.

In calculating horse-powers of steam boilers consider:

Tubular boilers, 15 square feet of heating surface, equivalent to 1 horse-power.

Portable boilers, 12 square feet of heating surface, equivalent to 1 horse-power.

Cylinder boilers, 10 square feet of heating surface, equivalent to 1 horse-power.

To find the area of safety-valve required:

Multiply the number of pounds of coal burned per hour by .045; or the number of pounds of water evaporated per hour by .006. The product is the area of a common valve required in square inches.

FOR CALCULATING THE SPEED OF DRUMS AND PULLEYS

Problem No. 1.—The diameter of the driven being given, to find its number of revolutions.

Rule.—Multiply the diameter of the driver by number of its revolutions, and divide the product by the diameter of the driven; the quotient will be the number of revolutions of the driven.

Problem No. 2.—The diameter and revolutions of the driver being given, to find the diameter of the driven that shall make any given number of revolutions in the same time.

Rule.—Multiply the diameter of the driver by its number of revolutions and divide the product by the number of revolutions of the driven; the quotient will be its diameter.



Problem No. 3.—To ascertain the size of the driver.

Rule.—Multiply the diameter of the driver by the number of revolutions you wish it to make, and divide the product by the revolutions of the driven; the quotient will be the diameter of the driver.

N. B.—In ordering Pulleys, be careful to give the exact size of the shaft on which they are to go; also state how you wish them finished on the face—flat face for shifting belt, or rounding for non-shifting.

HOW TO CALCULATE SPEED

To find the speed of a countershaft, if the revolutions of the main shaft and size of pulleys are given: Multiply the revolutions of the main shaft by the diameter in inches of the pulley on the countershaft; the quotient will be the number of revolutions.

Examples.—What will be the speed of a countershaft with a 12-inch pulley, driven by a 30-inch pulley 180 revolutions per minute? $180 \times 30 \div 12 = 450$.

To find the size of a pulley required, if the number of revolutions and size of pulley on the main shaft are given: Multiply the diameter in inches of driving pulley by the revolutions of the main shaft, and divide by the speed required; the quotient will be the diameter in inches of the pulley.

Example.—What will be the diameter of a pulley to make a countershaft turn 450 revolutions per minute, driven by a 30-inch pulley 180 revolutions per minute?

 $180 \times 30 \div 450 = 12$ -inch pulley.

To find the size of a pulley for a main shaft, if the speed of shafts, and diameter of the pulley on the countershafts are given: Multiply the diameter in inches of pulley by speed of the countershaft, and divide by the revolutions of the main shaft. The quotient will be the diameter of the pulley.

Example.—What will be the diameter of a pulley on a main shaft making 180 revolutions per minute to drive a 12-inch pulley 450 revolutions per minute?

 $450 \times 12 \div 180 = 30$ -inch pulley.

MEASUREMENT OF WATER IN PIPES

Square the diameter of the pipe in inches, and the product is the number of pounds weight of water in one yard of the pipe.

As a gallon of water weighs about ten pounds, divide the number of pounds by 10, and the result is the number of gallons of water in one yard of the pipe.

A gallon of fresh water weighs $8\frac{1}{2}$ pounds, and contains 231 cubic inches.

A cubic foot of water weighs $62\frac{1}{2}$ pounds, and contains 1,728 cubic inches, or $7\frac{1}{2}$ gallons.

LOSS BY FRICTION OF WATER IN PIPES

s the loss in pounds pressure per square inch for each 100 feet in length due

				CIVE (OF PIPES-INSIDE	FS-I	NATOR	DIA	DIAMETER	R				
Gals. per %-In	1. 1-In.	%-In. 1-In. 1½-In. 1½-In. 2-In.	1½-In.	2-In.	2½-In. 3-In.	3-In.	4-In.	6-In.	8-In.	10-In.	12-In.	6-In. 8-In. 10-In. 12-In. 14-In.	16-In.	18-In.
minute														
				::	:		:		:	:	:	:		
				0.12	:	:	:	:	:	:	:	:		
				:		:	:	:	:	:	:	:		:
				0.42		:	:	:	:		:		:	:
25 78.0			2.62		0.21	0.10	:	:	:	•	:	:	:	:
30			3.75	0.91	:	:	:	:	:	:	:	:	:	:
	37.0		5.05		:		:		:	:	:	:	:	
	48.0	16.1	6.52	1.60	:			:	:	:	:	:	:	:
8 8			8.15	:	•	:	:	:	:	:	:	:		:
			10.0	2.44	0.81	0.35	0.03	:	:	:	•	:	:	:
•			22.4	5.32		0.74		:				:	:	:
			39 0	9.46		1.31	0.33	0.05	:	:	:	:		
100	:	:	2	14.9		1.99		:	:	:	:	:	:	
125				21.2	7.0	2.85	0.69	0.10	:	:	:	:		
				28.1		3.85		:	:	:	:	:	:	:
				37.5		5.05		0.17	:	:		:	:	:
200		:	:			7.76		0.26	0.07	0.03	0.01	:	:	:
250					98 08	11.2		0.37	0.09	0.04	:::	:		
300	:	: : :	:			200	3.65	0.50	0.12	0.05	0.02	:		:
350	•	:		:	:	10		0.65	0.16	90.0	:	:	:	:
400	:		:	:	:	0 0 0		0.81	0.20	0.07	0.03	:		
450			:	:	:	0.00		96 0	000	000	0 04	0.017	0.009	
500					: : :	90.00	•	2000	01.0	200				

LOSS BY FRICTION OF WATER IN PIPES—Continued

2 21 0.53 0.18 0.08	4-In.	1-In.	14 -In	. 1½-In	$\frac{SL}{2-In}$	SIZE OF PIPES—INSIDE DIAMETER -In. 2%-In. 3-In. 4-In 6-In 8 In 4-In 8 In 8	PIPES 3-In.	INSI 4-In	DE D	IAME	TER	6			
2.21 0.53 0.18 0.08									0-111	0-111.	10-1n.	12-1n.	14-In.	16-In.	
3.88 0.94 0.32 0.13 0.062 1.46 0.49 0.20 2.09 0.70 0.29 0.135 0.95 0.38 1.23 0.49 0.23 0.95 0.38 1.23 0.49 0.23 0.63 0.63 1.11 0.515 1.11 0.516						:	•		2.21	0.53	0.18	0.08			
1.46 0.49 0.20 2.09 0.70 0.29 0.135 0.95 0.38 1.23 0.49 0.23 1.23 0.49 0.23 0.77 0.362 1.11 0.515 0.697			:				:	-	3.88	0.94	0.32	0.13	0 069	260 0	
2.09 0.70 0.29 0.135 0.95 0.38 1.23 0.49 0.234 0.63 0.77 0.362 1.11 0.515 0.697	:	:							:	1.46		0 20		000.0	
0.95 0.38 1.23 0.49 0.23 0.63 0.63 0.77 0.862 1.11 0.515 0.910	:	:								5 00	0 40	000			
1.28 0.49 0.234 0.68 0.68 0.77 0.862 0.77 0.862 0.77 0.862 0.697 0.697 0.697 0.697 0.697 0.910 0	:					:	:				000	00.00	001.0	0.071	
0.43 0.234 0.63 0.77 0.362 0.77 0.362 1.11 0.515 0.697	:	:			:					:	1 99	0.08			
0.77 0.362 (1.11 0.515 (1.12 0.515 (1.13 0.515 (1.14 0.515 (1.15 0.51 0.51 (1.15 0.515 (1.15 0.51 0.51 0.51 (1.15 0.51 0.51 (1	:	:			:					:	67.1	0.49	0.234	0.123	
1.11 0.565 1.11 0.565 0.910 0	:	:			:	:	:			:	:	0.00			
0 610.0 0 610.0 0 610.0 0 610.0			-	:		:					:	11.0	0.362	0.188	
0.910 0.		:	: :			:				:	:	11.11	0.010	0.267	
0.910 0.						:	:	33		:	:		0.697	0.365	
.0 0.		:	: : :	:						:	:	:	0.910	0.472	
		:		:				:	:	:	:	:	:	0.593	

SHEET METAL NO SUPPLY CO

Doubling the diameter of a pipe increases its capacity four times. Friction of liquids in pipes increases as the square of the velocity.

The mean pressure of the atmosphere is usually estimated at 14.7 pounds per square inch, so that with a perfect vacuum it will sustain a column of mercury 29.9 inches, or a column of water 33.9 feet high.

To find the pressure in pounds per square inch of a column of water: Multiply the height of the Approximately, we say, that every foot elevation is equal to 1/2 pound To find the height of a column of pressure per square inch; this allows for ordinary friction. water, multiply the pressure by 2.31. column in feet by .434.

VARIOUS WEIGHTS OF WATER

1	cubic inch	lbs.
	cubic inches	lbs.
		lbs.
1	cubic foot	lbs.
1	cylindrical inch	lbs.
12	cylindrical inches	lbs.
	cylindrical foot49.10	lbs.
	Imperial gallon10.	
	U. S. gallon 8.3311	
	cubic foot of water equals 7.48052	
1	cylindrical foot of water equals 6.	U. S. gallons
	A pressure of 1 pound per square inch is exerted	by a column

A pressure of 1 pound per square inch is exerted by a column of water 2.3093 feet, or 27.71 inches high, at 62° F.

A column of water at 62° F. one foot high presses on the base with a force of .433 pounds, or 6.928 ounces per square inch.

RULES TO ASCERTAIN THE CAPACITY OF CISTERNS AND TANKS

Cylindrical

Multiply square of diameter by depth in feet.

For Hogsheads, multiply by 373, divide by 4,000

For Barrels, multiply by 373, divide by 2,000

For Gallons. multiply by 47, divide by 8

For Gallons, multiply by 47, divide by 8

Example.—Required, the capacity in barrels (31½ gallons) of a cistern 18 feet deep, 12 feet diameter.

144 sq. of diam. 18 depth.

 $\frac{2,592}{373}$

2,000)966,816(483 bbls.

For tanks that are tapering, measure the diameter four-tenths from the large end.

Square or Oblong

Multiply length by width, and by depth.

For Hogsheads, multiply by 19, divide by 160 For Barrels, multiply by 19, divide by 80 For Gallons, multiply by 7 48/100

Example.—Required, the capacity in barrels (31½ gallons) of a cistern 18 feet long, 12 feet wide, 15 feet deep.

18 length. 12 wide.

216 15 depth.

 $3,240 \\
19$

80)61,560(769 bbls.



RULES RELATIVE TO THE CIRCLE

To find Circumference—	
Multiply diameter by	3.1416.
Or divide diameter by	0.3183.
To find Diameter—	
Multiply circumference by	0.3183.
Or divide circumference by	3.1416.
To find Radius—	
Multiply circumference by	0.15915.
Or divide circumference by	6.28318.
To find Side of an Inscribed Square	re—
Multiply diameter by	0.7071.
Or multiply circumference by	0.2251.
Or divide circumference by	4.4428.
To find Side of an Equal Square—	-
Multiply diameter by	0.8862.
Or divide diameter by	1.1284.
Or multiply circumference by	0.2821.
Or divide circumference by	3.545.

Square-

A side multiplied by 1.1442 equals diameter of its circumscribing circle.

A side multiplied by 4.443 equals circumference of its circumscribing circle.

A side multiplied by 1.128 equals diameter of an equal circle. A side multiplied by 3.547 equals circumference of an equal circle.

Square inches multiplied by 1.273 equals circle inches of an equal circle.

To find the Area of a Circle-

Multiply circumference by one-quarter of the diameter.

Or multiply the square of diameter by 0.7854.

Or multiply the square of circumference by .07958.

Or multiply the square of one-half diameter by 3.1416.

To find the area of an Ellipse-

Multiply the product of its axes by .785398.

Or multiply the product of its semi-axes by 3.14159.

Contents of cylinder = area of end \times length.

Contents of wedge \equiv area of base \times one-half altitude.

Surface of cylinder \equiv length \times circumference + area of both ends.

Surface of sphere \pm diameter squared \times 3.1416, or \pm diameter \times circumference.

Contents of sphere \equiv diameter cubed \times 0.5236.

Contents of pyramid or cone, right or oblique, regular or irregular = area of base × one-third altitude.

Area of triangle \equiv base \times one-half altitude.

Area of parallelogram \pm base \times altitude.

Area of trapezoid = altitude × one-half the sum of parallel sides. To find cubic inches in a globe multiply cube of diameter by .5236.

Any circle whose diameter is double that of another contains four times the area of the other.



WEIGHTS AND MEASURES

Avoirdupois Weight

Drachms.

$16 \equiv$	1 02	= 437	.5 gra	ins tro	У.
$256 \equiv$	$16 \equiv$	1 lb.	= 1.3	2153 lbs	s. troy.
6400 =	400 =	$25 \equiv$	1 qu	arter.	
25600 =	1600 =	100 =	4 =	1 cwt.	
512000 -	32000 -	2000 -	80 - "	20 - 1	ton

Troy Weight

Grains.

```
1 dwt.
  24 =
 480 \pm 20 \pm 1 oz.
5760 \pm 240 \pm 12 \pm 1 lb. \pm 22.816 cubic inches of distilled water at
    62° Fahr.
```

Dry Measure

Pints = 33.6 cubic inches.

2 = 1 quart = 67.2 cubic inches.

 $8 \pm 4 \pm 1$ gallon ± 268.8 cubic inches.

 $16 \pm 8 \pm 2 \pm 1$ peck ± 537.6 cubic inches.

 $64 \pm 32 \pm 8 \pm 4 \pm 1$ bushel.

Note.—The standard U.S. bushel is the Winchester bushel, which is in cylinder form, 181/2 inches in diameter and 8 inches deep, and contains 2,150.42 cubic inches.

Square Measure

Inches.

144 =1 foot. 9 1 yard. $272.25 \pm 30.25 \pm 1$ perch. 39204 -

1568160 = 10890 $\equiv 1210 \equiv 40 \equiv 1 \text{ rod.}$ $\pm 4840 \pm 160 \pm 4 \pm 1$ acre. 6272640 ± 43580

An acre is 69.5701 yards square; or, 208.710321 feet square.

A township is 6 miles square \pm 36 sections.

is 1 mile square $\equiv 640$ acres. is $\frac{1}{2}$ mile square $\equiv 160$ acres. A section is 1 A section

A section is $\frac{1}{4}$ mile square \pm 40 acres.

A span is the distance that can be reached between the end of the middle finger and the end of the thumb. Among sailors 8 spans are equal to 1 thumb.

A geographical mile is 1/21600 of the distance around the center of the earth.

A square mile of land is called a section.

A Gunter's chain, used by land surveyors, is 4 rods, or 66 feet long, and consists of 100 links, 7.92 inches make a link.

Canal and railroad engineers use an engineer's chain, which consists of 100 links, each 1 foot long.

Paper Measure

Quire of paper24 s	heets
Ream of paper	heets
Bundle	eams
Bale	ndles
Roll of parchment60	skins

Sheet of paper folded into-

- 2 leaves is termed folio size.
- 4 leaves is termed 4to or quarto.
- 8 leaves is termed 8vo. or octavo.
- 12 leaves is termed 12mo. or duodecimo.
- 16 leaves is termed 16mo.
- 18 leaves is termed 18mo.
- 24 leaves is termed 24mo.
- 48 leaves is termed 48mo.

Apothecaries' Weight

Grains.

20 =	1 scruple or	Э
60 =	3 ± 1 drachm or	3
480 -	24 - 8 - 1 oz. or	3

5760 = 288 = 96 = 12 = 1 lb. Apothecaries' Measure

50 minims = 1 fluid-drachm

8 fluid-drachms = 1 fluid-ounce

16 fluid-ounces = 1 pint 8 pints = 1 gallon

Forty-five drops, or a common teaspoonful, make about 1 fluiddrachm; 2 tablespoonsful, about 1 fluid-ounce; a wineglassful, about 1½ fluid-ounces; and a teacupful, about 4 fluid-ounces.

Liquid or Wine Measure

Gills = 7.2187 cubic inches.

1 pint = 28.875 cubic inches. 4 =

8 = $2 \equiv 1 \text{ quart} \equiv 57.75 \text{ cubic inches.}$

32 =8 = 4 ± 1 gallon.

2016 = 404 = 252 = 63 = 1 hogsnead. 4032 = 1008 = 504 = 126 = 2 = 1 pipe.

 $8064 \pm 2016 \pm 1008 \pm 252 \pm 4 \pm 2 \pm 1$ ton.

Note.—The standard unit and liquid measure adopted by the U. S. government is the Winchester wine gallon, which contains 231 cubic inches, and holds 8.339 pounds, avoirdupois, of distilled water, at its maximum density weighed in air, the barometer being at 30 inches.

The imperial gallon, adopted by Great Britain, contains 277.274

cubic inches, and equals 1.20032 U.S. gallons.

The following cylinders contain some of these measures very closely:

	Gill, diameter,	1 3/4	inches;	height.	3	inches
	Pint, diameter,	3 1/2	inches;	height,	3	inches
	Quart, diameter,	3 1/2	inches;	height,	6	inches
	Gallon, diameter,	7	inches;	height,	6	inches
8	Gallon, diameter,	14	inches;	height,	12	inches
10	Gallon, diameter,	14	inches;	height,	15	inches



Weight of Water

1 cubic inch	.03617	pounds
12 cubic inches		pounds
1 cubic foot	7.48052	U. S. gallons
1 U. S. gallon	8.3311	pounds
1.8 cubic feet	.2240	pounds
2240 pounds2	68.8	U. S. gallons

Liquid Weight

			Lbs. Avoirdupois.
1	gallon	distilled water	. 10.
1	gallon	sea water	. 10.32
1	gallon	proof spirits	9.08

Oils

			Lbs. Avoirdupois.
1	gallon	Sperm	7 1/2
1	gallon	whale	7 1/2
1	gallon	lard	7 1/2
1	gallon	tallow	7 1/2
1	gallon	neat's-foot	7 1/2
1	gallon	paraffine, 28° gravity	7 3/8
1	gallon	paraffine, 25° gravity	7 1/2
1	gallon	reduced Franklin	7 1/4
1	gallon	castor	8
		kerosene	

Solid Measures

	Cu. In.	Cu. Ft.
Cubic inch (subdivided decimally)	1	
1 foot x 1 inch x 1 inch	12	
1 foot x 1 foot x 1 inch	144	
Cubic foot (subdivided decimally or duo-decimally)	1728	1
Cubic yard	46656	27
Load of hewn timber		50
Perch of masonry ($\pm 16\frac{1}{2}$ square yards face x $1\frac{1}{2}$		
feet thick)		24 3/4
Cord of wood		128

A cubic yard of earth is called a load.

In civil engineering, the cubic yard is the unit to which estimates are reduced.

A pile 8 feet long, 4 feet wide, 4 feet high, contains 1 cord, and a cord-foot is 1 foot in length of such a pile.

In measuring timber for shipment, one-fifth of the solid contents of round timber is deducted for waste in hewing or sawing.

To Compute Weights of Different Materials

To compute the weight of cast metal by the weight of the pattern, when the pattern is of white pine.

Multiply the weight of the pattern in pounds by the following multipliers, and the product will give the weight of the casting: Iron, 15; brass, 16; lead, 23.5; tin, 15; zinc, 14.



Sheets

Steel—Divide the thickness, expressed in thousandths, by 25. The result is the weight in pounds per square foot.

Brass-Add 11 per cent. to the weight of sheet steel.

Copper-Add ten per cent. to the weight of sheet steel.

Bars and Plates

Iron—Multiply contents in cubic inches by .27777. Result will be weight in pounds.

Steel—Multiply contents in cubic inches by .28332. Result will be weight in pounds.

Copper—Multiply contents in cubic inches by .32118. Result will be weight in pounds.

Brass—Multiply contents in cubic inches by .3112. Result will be weight in pounds.

Lead—Multiply contents in cubic inches by .41015. Result will be weight in pounds.

Zinc-Multiply contents in cubic inches by .25318. Result will be weight in pounds.

Tin—Multiply contents in cubic inches by .26562. Result will be weight in pounds.

Aluminum—Multiply contents in cubic inches by .09375. Result will be weight in pounds.

Surveyor's Measure

7	92 inch	es .						 		1 link
25	links .							 		\dots 1 rod
4	rods							 		.1 chain
10	square	chai	ns or	160	sq.	rods	S	 		1 acre
640	acres							 	1 squ	are mile
									1 t	

Cubic Measure

1728 cubic inches1 cubic foot
27 cubic feet
40 cubic feet1 ton (shipping)
128 cubic feet
2150.42 cubic inches
268.8 cubic inches
1 cubic foot, about4/5 of a bushel



WEIGHT OF A CUBIC FOOT OF SUBSTANCES

Average V	
Anthracite, solid	93
Anthracite, broken loose	54
Anthracite, broken, moderately shaken	58
Anthracite, heaped bushel, loose	(80)
Ash, American white, dry	38
Asphaltum	87
Brick, best pressed	150
Brick, common hard	125
Brickwork, pressed brick	140
Brickwork, ordinary	112
Cement, hydraulic, ground, loose, American, Rosendale	58
Cement, hydraulic, ground, loose, American, Louisville	50
Cement, hydraulic, ground, loose, English, Portland	80
Cherry, dry	42
Chestnut, dry	41
Coal, bituminous, solid	84
Coal, bituminous, broken, loose	49
Coal, bituminous, heaped bushel, loose	(74)
Coke, loose, of good coal	27
Coke, loose, heaped bushel	(38)
Clay	119
Earth, common loam, dry, loose	76
Earth, common loam, dry, moderately rammed	95
Earth, as a soft flowing mud	108
Ebony, dry	76
Elm, dry	35
Elm, ary	162
Flint	$\frac{162}{157}$
Glass, common window	
Gypsum	143
Granite	170
Gravel, about the same as sand, which see.	0=
Hemlock, dry	25
Hickory, dry	53
[ce	58.7
Ivory	114
Lignum Vitae, dry	83
Lime, quick, ground, loose, or in small lumps	53
Lime, quick, ground, loose, thoroughly shaken	75
Lime, quick, ground, loose, per struck bushel	66
Limestones and Marbles	168
Limestones and Marbles loose, in irregular fragments	96
Mahogany, Spanish, dry	53
Mahogany, Honduras, dry	35
Maple, dry	49
Masonry, of granite or limestone, well dressed	165
Masonry, of mortar rubble	154
Masonry, dry (well scabbed)	138
Masonry, sandstone, well dressed	144
Mercury, at 32 deg. fahrenheit	849
Mica	183
Mortar, hardened	103
Mud, dry, close	110
Mud. wet. fluid. maximum	120

WEIGHT OF A CUBIC FOOT OF SUBSTANCES—Continued

, Liditi oi ii co	A	ve	ras	e'e	Wt	., Lbs.
Oak, live, dry						59
Oak, white, dry						52
Oak, other kinds				32	to	45
Oak, other kinds						55
Petroleum				• •		25
Pine, white, dry				* *	•	34
Pine, yellow, northern						45
Pine, yellow, southern			٠.	٠.	•	140
Plumbago				٠.		165
Quartz, common, pure			* *	• •		
Bosin				• •		69
Salt coarse						45
Calt fine for table use						49
Cand well shaken				98	w	117
Sand, perfectly wet			1	20	to	140
Sandstones, fit for building						151
Shales, red or black						162
Shales, red or black						175
Slate		• •			to	-
Snow, freshly fallen				15	to	
Snow, moistened and compacted by rain			• • •	. 16	10	125
Sulphur					•	149

Decimal Equivalents of Inches, Feet and Yards

Frac		Dec.		Dec.
of ar	L	of an		of a
Inch		Inch.		Foot.
16	=	.0625	=	.00521
1/8	_	.125	=	.01041
1/8 3 16	=	.1875	=	.01562
1/1	_	.25	=	.02083
5 16	_	.3125	=	.02604
3/2	=	.375	=	.03125
7 16	_	.4375	=	.03645
1/2	_	. 5	=	.04166
1/2 9 16 5/8 11 16	=	.5625	=	.04688
5/8	_	.625	=	.05208
11	==	.6875	=	.05729
3/4	_	.75	=	.06250
$\frac{13}{16}$	_	.8125	=	.06771
7/8	=	.875	=	.07291
15	=	.9375	=	.07812
Inche	es	Feet.		Yards.
1	=	.0833	=	.0277
2	=	.1666	=	.0555
3	=	. 25	=	.0833
4	=	.3333	=	.1111
5	_	.4166	=	.1389
6	=	. 5	=	.1666
7	=	.5833	=	.1944
8	_	.6666	=	.2222
9	=	.75	=	.25
10	=	.3833	=	.2778
11	=	.9166	=	.3055
12	=	.1	=	.3333



Rule for Determining the Weight of Live Cattle by Measurement

There are many rules for estimating the weight of cattle by measurement, but one of the authorities on the subject says that

"There is no rule that comes nearer than good guessing, and that no two animals will weigh alike according to measurement." The same authority further remarks that a rule as good as any is to find the superficial feet by multiplying the girth, just behind the shoulder blade, by the length from the fore part of the shoulder blade to the root of the tail. Thus, an ox girthing 7 feet, 9 inches and measuring 6 feet in length, would contain seven and three-fourths times six, or 46½ superficial feet For cattle, grass-fed, the following is given as the weight per superficial foot:

Girth less than 3 feet	11 lbe
Girth 3 to 5 feet	16 1bg
Girth 5 to 7 feet	. 16 lbs.
Cinth 7 to 0 feet	. 23 lbs.
Girth 7 to 9 feet	. 31 lbs.

Thus, the steer, as per above measurements, should weigh 46.50 by 31, or 1,441 pounds, gross. Under this rule it is usual to deduct one pound in twenty on half-fatted cattle; from fifteen to twenty pounds on a cow having had calves, and if not fat an equal amount. The author of this rule suggests its use only when the scale is wanting, as the scale is the only true standard.

How to Measure Timber and Lumber

To ascertain the number of cubic feet in round timber, find the average circumference by adding the circumference of the larger and smaller ends and dividing by 2; multiply the square of one-fourth of this average circumference by the length in feet; the result gives four-fifths of the real contents in cubic feet, one-fifth being customarily allowed to the purchaser for waste in sawing.

To measure contents of square timber, multiply the width by the thickness, in inches; this product by the length in feet, and divide by 12; result gives feet.

To measure boards, multiply length in feet by breadth in inches, and divide by 12 for inch boards; the quotient gives contents in feet. For boards 1½ inches thick, add one-quarter to quotient; if 1½, add one-half; if 2 inches, divide by 6 instead of 12; if 3 inches, divide by 4; if 4 inches, divide by 3; if 6 inches, divide by 2.



TABLE OF WEIGHTS AND MEASURES

Long Measure	Circular Measure
12 inches .1 foot 3 feet .1 yard 2 yards .1 fathom 16½ feet .1 rod 4 rods .1 chain 10 chains .1 furlong 8 furlongs .1 mile 3 miles .1 league	60 seconds 1 minute 60 minutes 1 degree 30 degrees 1 sign 60 degrees 1 sextant 90 degrees 1 quadrant 360 degrees 1 circle
Dry Measure	Table of Quantities
2 pints 1 quart 8 quarts 1 peck 4 pecks 1 bushel	12 units 1 dozen 12 dozen 1 gross 20 units 1 score
Liquid Measure	24 sheets
4 gills	
Avoirdupois Weight	General Measure
16 drams 1 ounce 16 ounces 1 pound 25 pounds 1 quarter 4 quarters 1 hundred 20 hundreds 1 ton	A mile 5280 feet A cubit .2 feet A pace .3 feet A palm .3 inches A hand .4 inches A span .10% inches
Apothecaries' Weight	
20 grains1 scruple	Wells and Cisterns hold for cach
3 scruples 1 dram 8 drams 1 ounce 12 ounces 1 pound	foot in depth: Diam, Gal.
Time Measure	2 feet
60 seconds 1 minute 60 minutes 1 hour 24 hours 1 day 7 days 1 week 52 weeks 1 year 12 calendar months 1 year 365 days 1 year	4 feet 94 5 feet 194 6 feet 211 7 feet 288 8 feet 375
Land Measure	A Box Contains
7.92 inches .1 link 25 links .1 rod 4 rods .1 chain 80 chains .1 mile	$4 \times 4 \times 4 \times 4 \times 4$ inches1 quart $8 \times 8 \times 8 \times 8 \times 4$ inches1 peck $26 \times 15 \times 4 \times 28$ inches1 bushel $24 \times 16 \times 28$ inches1 barrel

DECIMAL EQUIVALENTS OF AN INCH

8ths, 16ths, 32nds and 64ths

1	Frac. Dec. of an of an Inch. Inch.	Frac. of an Inch.	Dec. of an Inch.	
	$\begin{array}{cccccccccccccccccccccccccccccccccccc$.515625 .53125 .546875 .5625 .578125 .69375 .609375 .625 .6640625 .66625 .703125 .71875 .76875 .734375 .75 .766625 .78125 .78125 .78125 .828125 .828125 .84875 .859375 .876625 .90625 .921875 .9375 .9375 .94375	



SPECIFIC GRAVITY AND WEIGHT OF VARIOUS METALS

	a	Wt., of a	Wt. of a
	Specific	Cu. In.,	Cu. Ft.,
Metal.	Gravity.	Lbs.	Lbs.
Aluminum, cast	2.560	.0926	160.
Aluminum, wrought		.0906	156.5
Antimony		.2428	419.5
Brass, sheet, Cop., 75; Zinc, 25	8.450	.3056	528.
Brass, Yel., Cop., 66; Zinc, 34	8.300	.2997	517.9
Brass, plate	8.380	.3026	522.9
Brass, cast	8.100	.2930	506.3
Brass, wire	8.214	.2972	513.5
Bronze, Gun Metal	8.750	.3165	546.9
Bronze, Copper, 84; Tin, 16	8.832	.3194	551.9
Bronze, Copper, 81; Tin, 19		.2929	506.1
Bronze, Phos.—Bearing Metal	9.214	.3332	575.8
Copper, cast		.3179	547.2
Copper, plates		.3146	543.7
Copper, wire and bolts		.3212	555.1
Gold, pure, cast		.6965	1204.
Gold, hammered	19.361	.7003	1210.
Gold, 22 carats fine	17.486	.6325	1093.
Gold, 20 carats fine		.5682	981.8
Iridium, hammered		.8319	1437.
Iron, cast, gun metal		. 264	456.2
Iron, ordinary, mean		.2607	450.4
Iron, wrought bars		.2817	486.8
Iron, wrought wire	7.774	.2811	485.8
Iron, wrought rolled plates		.2787	481.6
Lead, cast	. 11.352	.4106	709.5
Lead, rolled		.4119	711.7
Mercury — 40 deg		.5661	978.2
Mercury + 32 deg		.4918	849.8
Mercury + 60 deg		.4908	848.1
Mercury 212 deg		.4836	835.7
Nickel		.3183	550.
Nickel, cast		.2994	517.4
Platinum, hammered		.7356	1271.
Platinum, native		.5787	999.9
Platinum, rolled	. 22.069	.7982	1379.
Red Lead		.324	559.9
Silver, pure, cast		.3788	654.6
		.3802	657.
Silver, hammered		.2828	488.7
Steel, tempered and hardened	7.806	.2823	487.7
Steel, plates	. 7.842	.2836	490.1
Steel, Crucible	. 7.852	.284	490.7
Steel, Bessemer		.2673	461.9
Tin, Cornish, hammered	7.291	. 2637	455.7
Tin, Cornish, pure		.2482	428.8
Zinc, cast	7.191	.26	449.4
Zinc, rolled		• 40	770.4



SPECIFIC GRAVITY OF VARIOUS SUBSTANCES

	Specific	Weight Per
	Gravity	
Asbestos		.1110
Emery	4 000	.144
Glass, flint	2.933	.1060
Glass, white	2.892	.1040
Glass, bottle		.0987
Glass, green	2.642	.0954
Marble, Parian	2.838	.1030
Marble, African		.0978
Marble, Egyptian	2.668	.0964
Mica		.1000
Chalk		.1000
Coral, red		.0974
Granite, Susquehanna		
		.0976
Granite, Quincy		.0958
Granite, Patapsco		.0954
Granite, Scotch		.0948
Marble, white, Italian		.0978
Marble, common		.0968
Tale, black		.0105
Quartz		.0962
Slate		.0965
Pearl, oriental		.0957
Shale		.0940
Flint, white		.0936
Flint, black		.0933
Stone, common		.0910
Stone, Bristol		.0906
Stone, mill		.0897
Stone, paving		.0873
Limestone		.097
Gypsum, opaque		.0783
Grindstone		.0775
Salt, common		.0770
Saltpetre		.0755
Sulphur, native		.0735
Common Soil		.0717
Rotten Stone		.0416
Clay		.0698
Brick		.0686
Nitre		.0686
Plaster Paris		
Ivory		.0659
Sand		.0958
Phosphorous		.0640
Borax		.0620
Coal, anthracite1.64		
Coal, Maryland		.0490
Coal, Scotch		.0470
Coal, Newcastle		.0460
Coal, bituminous		.0488
Earth, loose		.0542
Lime, quick		.0549
Charcoal	0.441	.0160



EFFECT OF HEAT UPON VARIOUS BODIES

When the Temperature is below 0 the Symbol — is prefixed

I	egrees.	D	egrees
Acetification ends	88	Linseed Oil boils	597
Acetious fermentation		Lead melts	610
begins	78	Mercury volatilizes	680
Air furnace	3300	Mercury freezes	-39
Ambergris melts	145	Milk freezes	-30
Aluminum melts	1160	Nitric acid spe. gravity	
Ammonia (liquid) freezes	46	1.424 freezes	-45
Antimony melts	951	Nitrious Oxide freezes	-150
Arsenic melts	365	Olive Oil freezes	36
Beeswax melts	151	Phosphorus melts	108
Bismuth melts	476	Phosphorus boils	560
Blood (human) heat	98	Pitch melts	91
Blood (human) freezes .	25	Platinum melts	3080
Brandy freezes	7	Potassium melts	135
Brass melts	1650	Proof Spirit freezes	7
Cadmium melts	600	Saltpetre melts	610
Charcoal burns	800	Sea water freezes	-28
Cold, greatest artificial	-166	Silver (fine) melts	1830
Cold, greatest natural	56	Snow and salt, equal	
Common fire	790	parts	0
Copper melts	1996	Spermaceti melts	112
Glass melts	2377	Spirits of turpentine	
Gold (fine) melts	2282	freezes	14
Gutta percha softens	145	Steel melts	2500
Heat, cherry red	1500	Steel polished, blue	580
Heat, cherry (Daniell) .		Steel polished, straw	100
Heat, bright red	1860	color	460
Heat, red visible by day	1077	Strong wines freeze	$\frac{-20}{226}$
Heat, white	2370	Sulphur melts	240
Highest natural temper-	447	Sulphur acid sp. gravity	-45
ature, Egypt	117	1.641 freezes	-46
Ice melts	32	Tallow melts	97
Iron (cast) melts	2100	Tin melts	421
Iron (wrought)	2980	Vinegar freezes	-28
Iron bright red in the	750		
dark	$752 \\ 884$	Vinous fermentation60 t Water, in vacuo, boils	98
Iron red hot in twilight	94	Zinc melts	740
Laru mens	34	Zine merts	110

MELTING POINTS OF FUSIBLE PLUGS

	Softens at	
2 Tin. 2 Lead	 365	372
2 Tin, 6 Lead	 372	383
2 Tin. 7 Lead	 377 1/2	388
		408



WEIGHT AND SPECIFIC GRAVITY OF LIQUIDS

		Wt. Per	Wt. Pe
	Specific	Cu. In.,	Gal.,
	Gravity.	Lbs.	Lbs.
Water, distilled, 62° F	1.	.036	8.33
Water, sea		.037	8.55
Water, Dead Sea		.045	10.4
Acid, Acetic	1.062	.038	8.78
Acid. Nitric	1.217	.044	10.16
Acid, Sulphuric	1.841	.067	15.48
Acid. Muriatic	1.2	.043	9.93
Alcohol, pure	.792	.029	6.7
Alcohol, proof	.916	.033	7.62
Alcohol of commerce		.030	6.93
Cider	1.018	.036	8.4
Honey	1.45	.052	12.
Milk		.037	8.55
Molasses	1.426	.05	11.66
Oil, Linseed	.940	.034	7.85
Oil, Olive	.915	.033	7.62
Oil, Turpentine	.870	.031	7.16
Oil, Whale	.923	.033	7.65
Naphtha		.031	7.
Petroleum	.878	.032	7.39
Tar		.036	8.4
Wines, average		.036	8.3

WEIGHT AND SPECIFIC GRAVITY OF GASES

	Specific	
	Gravity	Cubic F
Gas at 32° and Under 1 Atmosphere	Air = 1.	in 1 Ll
Chlorine		5.00
Carbonic Acid	1.529	8.10
Oxygen	1.105	11.20
Air		12.38
Nitrogen		12.72
Carbonic Oxide		12.80
Ammonia	.589	21.01
Light Carburetted Hydrogen	.552	22.41
Coal Gas		28.27
Hydrogen		178.8

TEMPERATURE OF FIRE

Appearance.	Temp. Fah.	Appearance.	Temp. Fah
Red, just visible	. 977°	Orange, deep	2010°
Red. dull		Orange, clear	2190°
Red, cherry, dull		White heat	2370°
Red, cherry, full		White, bright	2550°
Red, cherry, clear		White, dazzling	2730°



STRENGTH OF MATERIALS Ultimate Tensile Strength in Pounds per Square Inch

	Average
Brass, east	18000
Brass, wire	49000
Bronze or Gun Metal	36000
Copper, cast	19000
Copper, sheet	30000
Copper, wire	60000
Iron, cast, 13,400 to 29,000	16500
Iron, wrought, ordinary bar	45000
Iron, wrought, bar, double refined50000 to	54000
Iron, wrought, boiler plates48000 to	56000
Iron, wire	100000
Iron, wire ropes	100000
Tond onet	90000
Lead, cast	2000
Lead, pipe	1650
Steel65000 to	120000
Tin	4600
Zinc	3500

SHRINKAGE OF CASTINGS

In locomotive cylinders is $\frac{1}{16}$ inch in a foot. Pipes is \(\frac{1}{8} \) inch in a foot.

Girders, beams, etc., is 1/8 inch in 15 inches.

Engine beams, connecting rods, etc., is ½ inch in 16 inches. Large cylinder, say 70 inch diameter, 10 foot stroke, the con-

traction of diameter is % inch at top, ½ inch at bottom, and ½ inch in 16 inches in length.

Thin brass is 1/8 inch in 9 inches. Thick brass is 1/8 inch in 10 inches. Zinc is $\frac{5}{16}$ inch in a foot. Lead is $\frac{5}{16}$ inch in a foot.

Copper is $\frac{3}{16}$ inch in a foot. Bismuth is $\frac{5}{32}$ inch in a foot. Tin is ¼ inch in a foot.

THE WEIGHT OF ANY PIECE OF WROUGHT IRON For Determining

One cubic foot of wrought iron..... = 480One square foot, one inch thick, = 480/12 = 40lbs. One square inch, one foot long, = 40/12 =31/3 lbs. One square inch, one yard long, $\equiv 3\frac{1}{3} \times 3 \equiv 10$

The weight of any piece of wrought iron in pounds per yard is equal to ten times its area in square inches.

Example.—The area of a bar $3'' \times 1'' = 3$ square inches, and its

weight is 30 pounds per yard.

For round iron the weight per foot may be found by taking the diameter in quarter inches, squaring it, and dividing by 6.

Example.—What is the weight of 2" round iron? $2'' \equiv 8$ quarter inches. $8^2 \equiv 64$.

 $64/6 \equiv 10\%$ pounds per foot of 2" round. Example.—What is the weight of 34" round iron?

 $\frac{34}{}'' \equiv 3$ quarter inches. $3^2 \equiv 9$. $9/6 = 1\frac{1}{2}$ pounds per foot of $\frac{3}{4}$ " round.

The above rules are highly convenient, and enable mental calculations of weight to be quickly obtained with accuracy.

TABLE FOR EQUALIZING PIPES

The size of main pipe is given in the column at the left. The number of branches is given in the line on top, and the proper size of branches is given in the body of the table on the line of each main and beneath the desired number of branches.

In commercial sizes the nominal 1¼ inch pipe is generally over size. Often as large as 1%. It is safe to call it 1.3 inches, and it is so figured in the table. Exact sizes are given for branch pipes. The designer of the pipe system can thus better select the commercial sizes to be used.

2 3 4 . 758 . 644574 . 985838774 1.14967861 1.52967861 1.52967861 2.279272 2.652.262.30 3.412.902.58 3.412.902.58 4.65932.30 6.82942.30 6.839495 6.8495 6.859495 6.869495 6.8794 6.8894 6.8694 6.8794 6.8694 6.8794 6.8694 6.8794 6.8694 6.8794 6.8794 6.8694 6.8794 6.8794 6.8694 6.8794 6.8794 6.8694 6.8794 6.8794 6.8694 6.87					
8 4 6 4 6 4 6 4 6 4 6 6 4 6 6 6 6 6 6 6	NUMBER O	F BRANCHES			
. 758644574	4 5	9	2	_∞	6
. 985 . 147 1.14 1.52 1.86 1.86 1.86 1.86 1.89 1.90 1.15		.488	.459	.435	.415
1.14 1.52 1.89 1.89 1.90 1.44 1.89 1.90 1.44 1.61 1.44 1.61 1.44 1.61 1.44 1.61 1.44 1.61 1.72 2.26 2.01 2.26 2.01 2.30 3.41 2.90 2.87 4.65 3.87 4.65 6.06 6.06 6.06 6.82 6.84		.625	.597	.556	.540
1.52 1.89 1.61 1.89 1.61 1.61 1.44 1.65 2.25 3.41 2.90 2.58 2.30 3.97 3.97 3.87 4.65 5.80 6.82 6.82 6.82 6.44 6.44 6.44 6.44 6.44 6.44		.733	689	.653	.623
1.89 1.89 1.61 2.27 1.92 1.72 2.26 3.41 3.97 3.22 5.30 4.51 6.06 6.06 6.82 6.44		776.	. 918	.870	.830
2.27 2.27 2.65 2.03 3.41 2.90 2.26 2.30 3.41 2.90 2.87 3.22 5.87 5.80 6.82 6.82 6.82 6.84 6.84 6.84		1.22	1.15	1.09	1.09
2.65 2.26 3.41 2.58 2.90 2.00 2.00 2.00 2.00 2.00 2.00 2.00 2.00 2.00 2.00		1.47	1.38	1.31	1.25
3.03 3.41 2.90 2.90 2.58 3.97 3.87 4.65 5.30 6.06 5.16 6.82 6.82 6.82 6.44		1.71	1.61	1.52	1.45
3.41 2.90 2.58 4.65 3.22 2.87 5.30 4.51 4.02 6.06 5.16 4.59 6.82 6.44 5.17		1.95	1.84	1.74	1.66
3.97 3.22 3.87 3.45 5.30 4.51 4.50 6.06 6.82 6.82 6.44 6.45 6.44 6.45 6.44 6.45 6.44 6.45 6.44 6.45 6.44 6.45		2.20	2.07	1.96	1.87
4.65 3.87 3.45 5.30 6.06 5.16 4.59 6.82 6.44 6.44 6.74		2.44	2.30	2.18	2.08
5.30 4.51 4.02 6.06 5.16 4.59 6.82 5.80 5.17 7.58 6.44 5.74		2.93	2.75	2.61	2.49
6.06 5.16 4.59 6.82 5.80 5.17 7.58 6.44 5.74		3.42	3.21	3.05	2.91
6.82 5.80 5.17 7.58 6.44 5.74		3.91	3.67	3.48	3.32
6.44 5.74		4.40	4.13	3.92	3.74
0000		4.88	4.59	4.35	4.15
6.83		5.86	5.51	5.22	4.98



TABLE FOR EQUALIZING PIPES—Continued

f Main 10 11 13 13 13 14 15 2 17 2 2 19 2 19 2 2 19 2 2 19 2 2 19 2 2 19 2 2 2 2 2 2 2 2 2 2 2 2 2	=	- NITWEER				
		TO THE COL	OF	BRANCHES		
	11	12	13	14	15	16
	.383	.370	358	348	335	066
	.498	.482	466	459	440	30.
	575	100	000	1047	044.	. 4.
	766	000	0000	776.	800.	. 45
	001	041.	1.17.	969.	.677	99.
	806.	. 925	968.	.870	.846	×
	1.15	1.11	1.08	1.04	1 09	
	1.34	1.30	1.25	1.99	2 -	
	1.53	1.48	1.43	330	1.10	1.1.
	1.72	1.67	1.61	20.0	1.00 1 E9	T. 52
	1.99	200	1 70	- F	1.92	1.4
	9.30	66.6		T-0	1.69	1.65
02.6	00.0	1 (1)	01.7	2.03	2.03	1.98
6.0	2.68	2.59	2.51	2.44	2.37	9 31
3.18	3.09	2.96	2.87	87.6	6 71	10
3.58	3.45	3 33	3 93	0 0 0	7.0	20.00
3.98	3.83	3 70	00.00	0 10	9.04	2.9
4.78	4 60	7 7	00.0	0.40	6.38	3.30



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